# POPULAR SCIENCE

MONTHLY

**MECHANICS - AUTOS - HOMEBUILDING**

How to Make a SANTA WINDOW

Page 163

25¢ December

## All About 1953 Plymouth and Packard

Copyrighted material

State Commander V-8 Starliner. White sidewall tires, chrome wheel discs—and glare-reducing tinted glass—optional at extra cost

# Own this style star and stand-out gas saver

YOU'RE the envy of all eyes as you proudly drive this trim, sleek, beautifully jet-streamed Studebaker.

But what pleases you even more, you save gas every mile. Your Studebaker is a team-mate of the Champion and Commander V-8 that finished first and second in actual gas mileage in this year's Mobilgas Economy Run to lead all standard class cars competing.

The Studebakers, and most other Mobilgas Run contenders, used Overdrive. It's optional, like Studebaker Automatic Drive, in all Studebaker models at extra cost. Stop in at a nearby Studebaker showroom.

1852 1952

**Studebaker**

One hundred years of progress on the roadways of the world

**America bought its first Studebakers in the California "gold rush" days**

A "prairie schooner" for a westbound caravan was among the earliest Studebaker vehicles. Today, 100-year-old Studebaker is one of the largest car and truck manufacturers in the world.

Copyrighted material

Copyrighted material

*America's Leading New-Idea Magazine for 80 Years*

*Founded 1872, Vol. 161: No. 6*

# POPULAR SCIENCE

REG. U. S. PAT. OFF. *Monthly*

***Mechanics and Handicraft***

REG. U.S. PAT. OFF.

VOLTA TORREY, EDITOR • Howard Allaway, MANAGING EDITOR
Howard C. Jensen, ART EDITOR • Frank Rowsome Jr., ASSISTANT MANAGING EDITOR

SENIOR EDITORS: Harry Walton (Mechanics & Handicraft), Hartley E. Howe (Features), Martin Mann (Copy).

ASSOCIATE EDITORS: Alden P. Armagnac, Henry B. Comstock, Devon Francis, Sheldon M. Gallager, Kendall W. Goodwyn, Wesley S. Griswold, Herbert O. Johansen, Herbert R. Pfister, Denis Sneigr, Robert P. Stevenson, Ruth Westphal, Andrew R. Boone (Los Angeles).

ART: Harry Samuels (Director), Herbert Anthony, Rolf O. Erickson, Eric Karminski Jr., Richard Meyer, Frances Cooper Daniels.

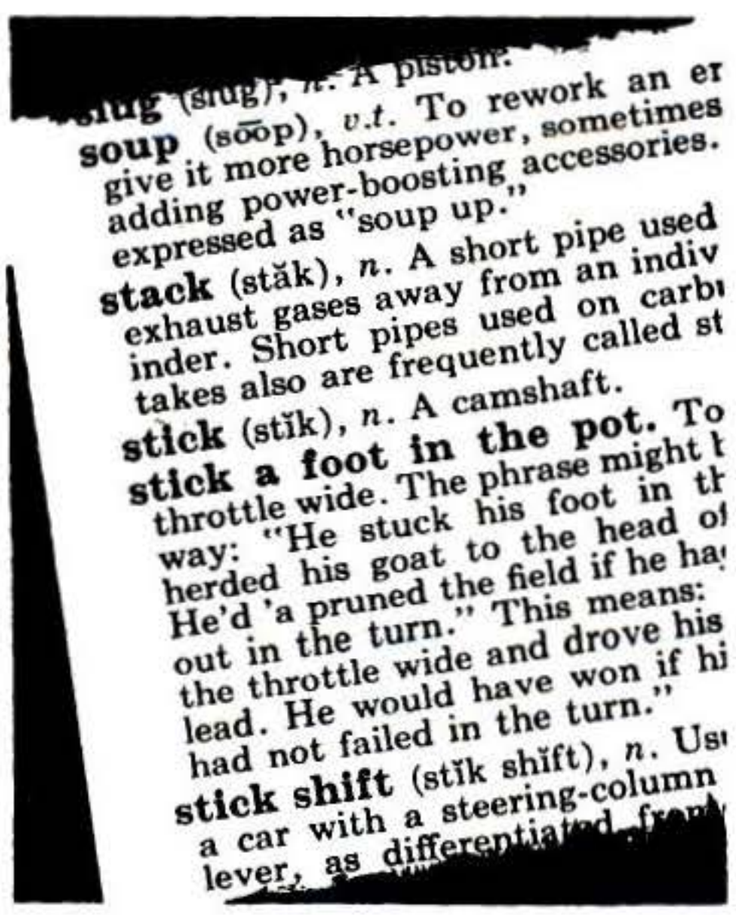
PHOTOGRAPHY: W. W. Morris (Director), Hubert Luckett, Orlando Guerra.

EDITORIAL ASSISTANTS: Harriet Trowbridge, Carol Ennis, Carol Schapiro, Georgette Sparks, Katharine W. Townsend, Jeanne Van Houten.

DECEMBER, 1952

## *This Month's Big Features:*

**Riding America's Biggest Mail Train..... 81**
**Can We Live Without Weight?..... 88**
**His Floats Lead the Parades..... 98**
**Shaw on '53 Plymouth and Packard.....108, 115**
**How Soon Will You Ride Jets?.....120**
**Harvesting Our Biggest Crop..... 127**
**The World's Most Mysterious Footprints.....132**
**Los Angeles Prepares for More Traffic.....139**
**Experts Pick 1952's Big Science News.....150**
**What's Happened to "Bouncing Putty".....156**
**Make Your Home a Christmas Card.....163**
**3 New Multipurpose Tools Unveiled.....168**
**How to Build a Rev Counter for Your Car....174**
**Gus Rescues Ten Little Angels.....180**
**Flying a Plane in the Living Room.....200**
**6 Ways to Remove Broken Screws and Taps..208**
**New Cameras Popularize Stereo Photos.....218**
**Hobbyhorse Runs on 1/10th Horsepower....223**


**soup** (sōōp), *v.t.* To rework an er
give it more horsepower, sometimes
adding power-boosting accessories.
expressed as "soup up."
**stack** (stăk), *n.* A short pipe used
exhaust gases away from an indiv
inder. Short pipes used on carb
takes also are frequently called st
**stick** (stĭk), *n.* A camshaft.
**stick a foot in the pot.** To
throttle wide. The phrase might
way: "He stuck his foot in th
herded his goat to the head o
He'd 'a pruned the field if he ha
out in the turn." This means:
the throttle wide and drove his
lead. He would have won if hi
had not failed in the turn."
**stick shift** (stĭk shĭft), *n.* Us
a car with a steering-column
lever, as differentiated fro

***A hot-rod dictionary** has been on our list of 10-most-needed literary works for a long time. This month the job is complete. If hot-rod words are Hindustani to you, see page 185 for the definitions—and you'll soon have a hot-rodder's gift of gab.*

***(More features and departments are listed on page 4.)***

Godfrey Hammond, PUBLISHER • Stephen P. Glennon, ADVERTISING DIRECTOR

ADVERTISING OFFICES: NEW YORK — 353 Fourth Ave.; CHICAGO—360 North Michigan Ave.; DETROIT—820 Book Bldg.; SAN FRANCISCO—681 Market St.; CLEVELAND—328 Citizens Bldg.; LOS ANGELES—2550 Beverly Blvd.
EDITORIAL OFFICES: 353 Fourth Avenue, New York 10, N. Y.

Published monthly at 353 Fourth Avenue, New York 10, N. Y., by Popular Science Publishing Co., Inc., Godfrey Hammond, President and Treasurer; R. C. Wilson, Stephen P. Glennon, Vice-Presidents; F. W. Briggs, Secretary. Entered as second-class matter Dec. 28, 1918, re-entered as second-class matter July 26, 1948, at the Post Office in New York, N. Y., under the act of March 3, 1879; additional entry as second-class matter at Dayton, Ohio. Entered as second-class matter at the Post Office Department, Canada. Printed in U.S.A. Copyright, 1952, by Popular Science Publishing Co., Inc. All rights reserved in the United States, Great Britain, and in all countries participating in the International Copyright Convention and Pan-American Copyright Convention. Yearly subscriptions to United States, its possessions and Canada, $3.00 (2 years, $5.50; 3 years, $7.50); foreign countries $1 per year extra. Four weeks' notice is needed to change a subscriber's address. Please give both old and new addresses, including postal zone numbers.



Copyrighted material

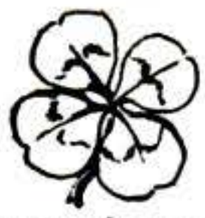
# They claim this coupon brings you "good luck"

"Six months after mailing the coupon, I had a promotion and a big raise in pay!"

"From the moment I marked the coupon, my luck changed!"

"My break came when I sent the coupon!"

***These statements are typical!*** I.C.S. gets letters like these regularly. Coupon senders report pay raises. Others win important promotions or new, interesting assignments. Still others find happiness, job security, opportunities never dreamed possible.



***Is it LUCK?*** The results are so impressive, so quick in coming, that some say the I.C.S. coupon is "lucky." Of course, that's not true. The real reason for these amazing results is what happens to the person when he or she mails the coupon.

***Coupon is first step!*** Naturally, you want to make good. But you've put off doing something about it. Mailing this coupon is *definite action!* It shows you're fed up with waiting for the breaks. You're determined to make your own breaks! And this determination alone accounts for much of the "luck" you'll start to experience.

***You get free guidance!*** Within a few days you get the helpful and inspiring 36-page book, "How to Succeed." It's crammed with information. For example, it tells you in detail how to plan your career. Also how to prepare for advancement. In addition, you get a free catalog on the I.C.S. course that interests you. With your new-found determination and these two books as your guides, you're ready to cash in on your hidden abilities!

***391 I.C.S. courses!*** You'll find a partial list of courses in the coupon below. Each course is up-to-date, extremely practical, completely success-tested. You study in your spare time. Set your own pace. Correspond directly with instructors. Cost is low. Diplomas are awarded to graduates. I.C.S. training rates high in all fields of business and industry. You won't find another school like it.

***Call it being "lucky" or being "smart." Whatever it is, you're one step closer to your goal when you mail this famous coupon!***

## INTERNATIONAL CORRESPONDENCE SCHOOLS

ICS

**BOX 7620-N, SCRANTON 9, PENNA.**

Without cost or obligation, send me "HOW to SUCCEED" and the booklet about the course BEFORE which I have marked X:

**ART**
- ☐ Commercial Art
- ☐ Magazine and Book Illustrating
- ☐ Cartooning
- ☐ Show Card and Sign Lettering
- ☐ Fashion Illustrating

**AUTOMOTIVE**
- ☐ Automobile, Mechanic
- ☐ Auto-Elec. Technician
- ☐ Auto Body Rebuilding and Refinishing
- ☐ Diesel—Gas Engines

**AVIATION**
- ☐ Aeronautical Engineering Jr.
- ☐ Aircraft Engine Mechanic
- ☐ Airplane Drafting

**BUILDING**
- ☐ Architecture
- ☐ Arch. Drafting
- ☐ Building Contractor
- ☐ Estimating
- ☐ Carpenter and Mill Work
- ☐ Carpenter Foreman
- ☐ Reading Blueprints
- ☐ House Planning
- ☐ Plumbing
- ☐ Heating
- ☐ Steam Fitting
- ☐ Air Conditioning
- ☐ Electrician

**BUSINESS**
- ☐ Business Administration
- ☐ Certified Public Accountant
- ☐ Accounting
- ☐ Bookkeeping
- ☐ Stenography and Typing
- ☐ Secretarial
- ☐ Federal Tax
- ☐ Business Correspondence
- ☐ Personnel and Labor Relations
- ☐ Advertising
- ☐ Retail Business Management
- ☐ Managing Small Business
- ☐ Sales Management
- ☐ Salesmanship
- ☐ Traffic Management

**CHEMISTRY**
- ☐ Chemical Engineering
- ☐ Chemistry
- ☐ Analytical Chemistry
- ☐ Petroleum—Nat'l Gas
- ☐ Pulp and Paper Making
- ☐ Plastics

**CIVIL, STRUCTURAL ENGINEERING**
- ☐ Civil Engineering
- ☐ Structural Engineering
- ☐ Surveying and Mapping
- ☐ Structural Drafting
- ☐ Highway Engineering
- ☐ Reading Blueprints
- ☐ Concrete Construction
- ☐ Sanitary Engineering

**DRAFTING**
- ☐ Aircraft Drafting
- ☐ Architectural Drafting
- ☐ Electrical Drafting
- ☐ Mechanical Drafting
- ☐ Structural Drafting
- ☐ Sheet Metal Drafting
- ☐ Mine Surveying and Drafting

**ELECTRICAL**
- ☐ Electrical Engineering
- ☐ Electrician
- ☐ Electrical Maintenance
- ☐ Electrical Drafting
- ☐ Electric Power and Light
- ☐ Lineman

**HIGH SCHOOL**
- ☐ High School Subjects
- ☐ College Preparatory
- ☐ Mathematics
- ☐ Commercial
- ☐ Good English

**MECHANICAL AND SHOP**
- ☐ Mechanical Engineering
- ☐ Industrial Engineering
- ☐ Industrial Supervision
- ☐ Foremanship
- ☐ Mechanical Drafting
- ☐ Machine Design-Drafting
- ☐ Machine Shop Practice
- ☐ Tool Design
- ☐ Industrial Instrumentation
- ☐ Machine Shop Inspection
- ☐ Reading Blueprints
- ☐ Toolmaking
- ☐ Gas—Electric Welding
- ☐ Heat Treatment—Metallurgy
- ☐ Sheet Metal Work
- ☐ Sheet Metal Pattern Drafting
- ☐ Refrigeration

**POWER**
- ☐ Combustion Engineering
- ☐ Diesel—Electric
- ☐ Electric Light and Power
- ☐ Stationary Steam Engineering
- ☐ Stationary Fireman

**RADIO, TELEVISION, COMMUNICATIONS**
- ☐ General Radio
- ☐ Radio Operation
- ☐ Radio Servicing—FM
- ☐ Television
- ☐ Electronics
- ☐ Telephone Work

**RAILROAD**
- ☐ Locomotive Engineer
- ☐ Diesel Locomotive
- ☐ Air Brakes ☐ Car Inspector
- ☐ Railroad Administration

**TEXTILE**
- ☐ Textile Engineering
- ☐ Cotton Manufacture
- ☐ Rayon Manufacture
- ☐ Woolen Manufacture
- ☐ Loom Fixing
- ☐ Finishing and Dyeing
- ☐ Textile Designing

**HOME ARTS**
- ☐ Dressmaking and Designing
- ☐ Cookery
- ☐ Tea Room Management

Name_____ Age_____ Home Address_____

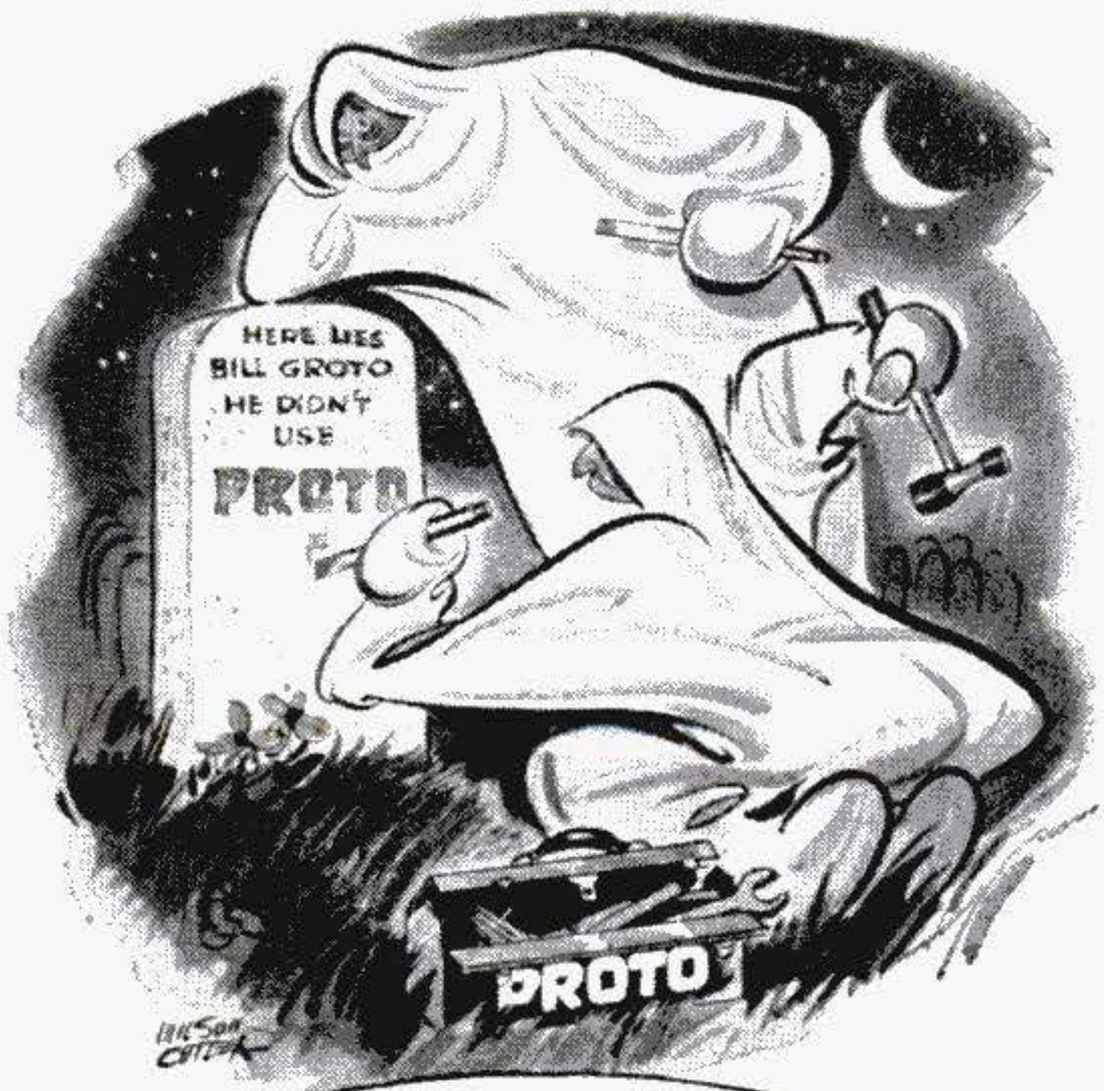
City_____ State_____ Working Hours_____ A.M. to_____ P.M.

Occupation_____

Special tuition rates to members of the Armed Forces. Canadian residents send coupon to International Correspondence Schools Canadian, Ltd., Montreal, Canada



Copyrighted material




**Tool Experts Know, and Even Ghouls... that PROTO means PROfessional TOols!**

The PROTO Line Includes Wrenches of All Types, Pliers, Screwdrivers, Punches, Chisels, Industrial Tools and Many Others.

**Superior design is one of the big reasons why PROTO tools are preferred by *professionals.* Each tool is light but strong, balanced, easy handling and snug fitting. Long life and extra safety are due to properly engineered designs, accurate manufacture, special alloy steels and scientific heat treating. Buy PROTO, the truly *professional* tools, from your dealer today. Send 10¢ for 68-page catalog to**

**PLOMB TOOL COMPANY**

**2257Q Santa Fe Ave., Los Angeles 54, Calif.**

5282

PROTO TOOLS
Professional Quality
REG. U.S. PAT. OFF.
MADE IN U.S.A.
LOS ANGELES
PROTO means PROfessional TOols


### News and Pictures


Air Douses Oil Fire..... 86
Will This Train Top 200 M.P.H.?..... 94
Motor Keeps Guided Missiles Steady..... 97
German Racer Is Testing Laboratory.....103
This Building Is a Stack of Flapjacks....104
'53 Lincoln Has 205-Hp. Engine.....113
'53 De Soto Goes European in Styling....114
Aircraft Engineer Builds Sports Car.....124
GIs Build Mobile Stairway from Scrap....131
Largest Tire Supports 8 Tons.....143
Mobile Pipeline to Fight A-Fires.....144
How an Automatic Choke Works.....146
Car Goes 10,000 Miles Without a Stop....147
New Furniture Does Two Jobs.....154


### Mechanics and Handicraft


See Where You're Going.....173
Winter Driving Tips.....178
Noah's Ark Animals.....189
One-Evening Shop Projects.....190
Can You Change Your Hot-Water Fuse?..192
Cardboard Mailing Boxes Protect Gifts..194
Racer Has Rubber-Band Power.....198
"Do-Nothing" Box Keeps Child Busy.....203
Hints for Model Rail Fans.....204
Glazing with Glass Beads.....212
Jigs Save Saw Time.....214
Stereo Fools Your Eyes.....220
Emergency Crystal Runs Regular Radio..222
How to Tame Balky Flashlights.....226


### Departments

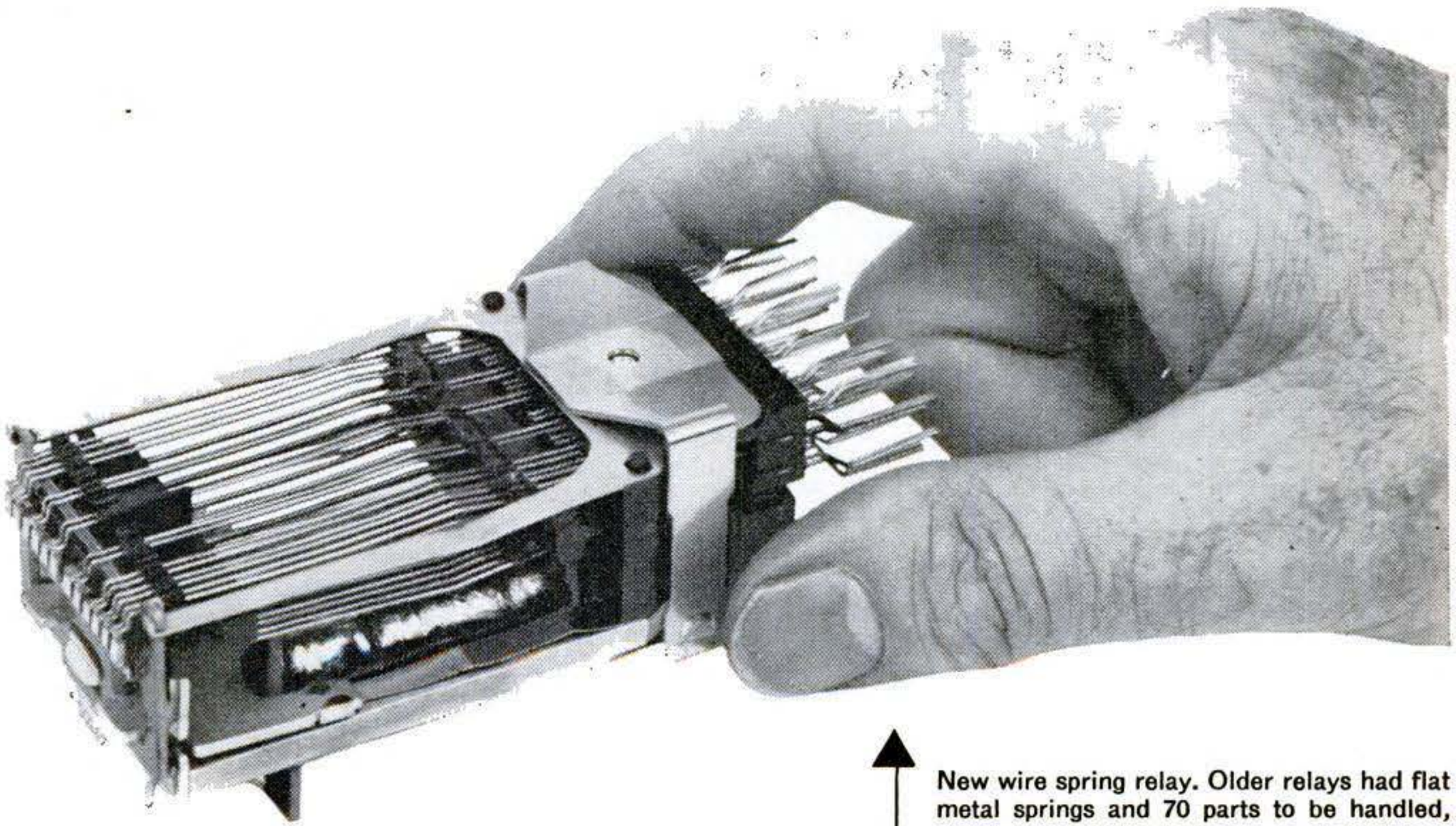

Letters ..... 8
I'd Like to See Them Make.....119
New Ideas from the Inventors.....137
P.S. Last Minute News and Notes.....162
New Tools.....171
Hints from the Model Garage.....183
Keeping the Home Shipshape.....196
New Shop Ideas.....206


*COMING NEXT DECEMBER . . .*

## More Christmas Ideas

Do you plan to build a Christmas display for your home like those on pages 163 to 167? Do you have plans for special exterior lighting effects or for interior Christmas-tree or Nativity arrangements? If so, unlimber your camera and shoot some pix. Then write a one-page description of your holiday display and send it along with the pictures to Christmas Editor, POPULAR SCIENCE MONTHLY, 353 Fourth Avenue, New York 10, N. Y. We will pay $25 for each such letter accepted for publication next year. Material cannot be returned unless accompanied by a stamped, self-addressed envelope.

# It splits seconds even faster

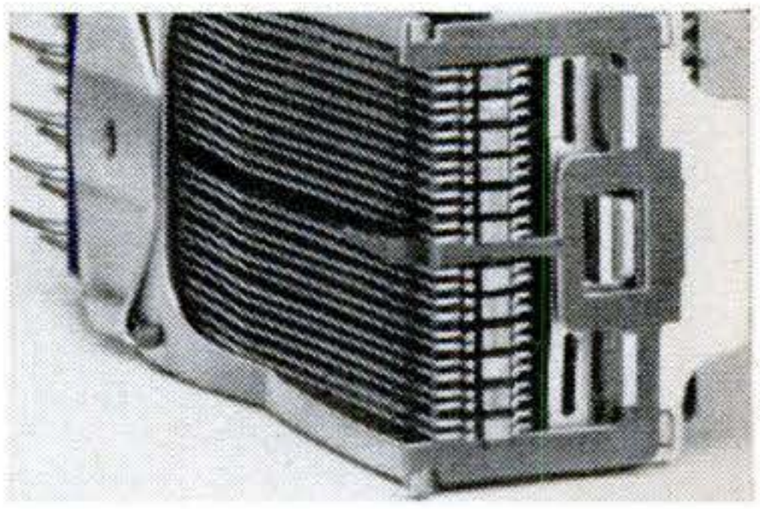


New wire spring relay. Older relays had flat metal springs and 70 parts to be handled, compared with 12 in the new model. Relays operate by means of an electromagnet which responds to high-speed pulses.

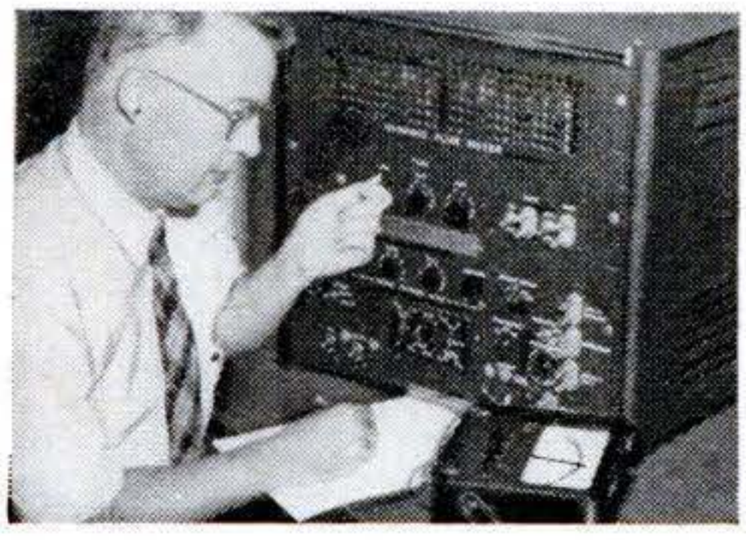
In a split second, relays, which are high-speed switches, set up dial telephone connections. Then they are off to direct the next call. Yet even this speed is too slow for Bell Laboratories scientists in quest of still faster switching.

Scientists and engineers devised a new relay – the wire spring relay – and worked out the production problem with Western Electric, manufacturing unit of the Bell System. This is twice as fast, uses less power and costs less to make and maintain.

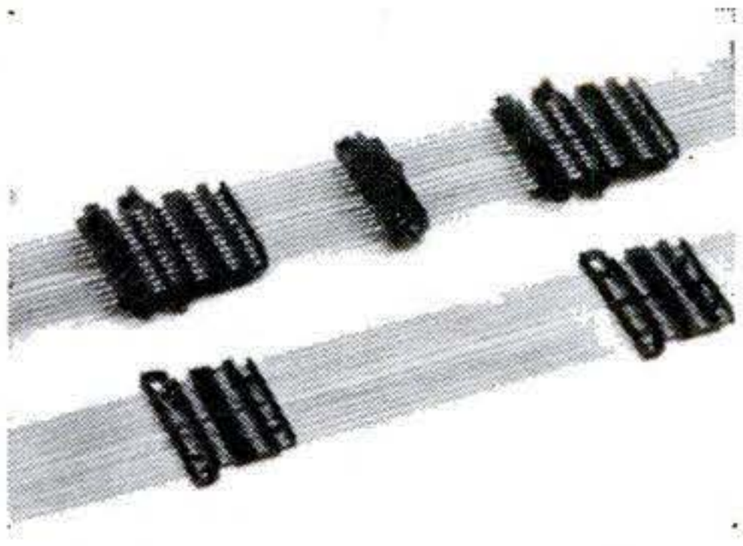
With speedier relays, switching can be done with less equipment . . . and calls go through faster. The wire spring relay is a practical example of how Bell Telephone Laboratories and Western Electric pool their skills to improve telephone service while keeping its cost down.



New relays must be able to operate one billion times—equal to once-a-second for 30 years. Employing a sound recorder as a precision vibrator, Bell scientists learned to evaluate the effect of sideways motion on relay life. Such rubbing motion is limited to one-thousandth of an inch in the new relays.



Dynamic Fluxmeter, developed by Bell Telephone Laboratories, indicates flux build-up in intervals of 25 millionths of a second. Precise information like this was essential to higher speed operation.



Relay springs as they come from Western Electric molding machine, before being cut apart for use. Molding technique saves time and money . . . makes possible the maintenance of relays in precision adjustment.

## Bell Telephone Laboratories

Improving telephone service for America provides careers for creative men in scientific and technical fields.

Copyrighted material

# Now You Can Get 41 Miles A Gallon from Your Car!

*By Raymond J. Carpenter*

**IN 1948 SOME OF THE NATION'S TOP EXPERTS ON AUTO ECONOMY AND EFFICIENCY GATHERED TO PROVE ONCE AND FOR ALL *THE TRUE CAPABILITIES OF THE AMERICAN AUTOMOBILE.* After five months of testing and experimentation these men proved that any car, regardless of make or age and with only minor adjustments, can get from 35 to 45 miles per gallon of gas . . . and can run up to 15,000 miles without an oil change.**

I am already benefiting from the facts these experts uncovered. If your car is less than 15 years old, *read this story carefully* for information on how you can get 2 to 9 more miles per gallon of regular gas. Learn how to . . . boost horsepower up to 30% . . . increase top speed up to 32 more miles per hour . . . get 30,000 miles from your tires . . . zoom from 0 to 60 miles per hour in 12 seconds.

### These Facts Are the Key to Top Performance

All experiments conducted by these automotive economy experts were made on *average* cars like yours and mine, and under *average* conditions. No changes or adjustments were permitted that you couldn't make with the tools in your own or your mechanic's garage. Fuel experts attending the meet worked out money saving fuel mixtures and carburetion hints . . . some of which are revealed in this article.

### Where Your Gas. Really Goes!

These engineers discovered that as much as 80c out of every gasoline dollar you spend is WASTED. They proved that up to 30% of generated engine power doesn't move your car one inch . . . it only serves to overcome engine friction. As much as 20% is lost as it blows out your exhaust pipe. Another 30% operates your engine's cooling and ignition systems.

If you know these facts and know how to apply a few simple economy secrets, you can DOUBLE THE PRESENT MILEAGE AND POWER of your car.

### What You Can Do About This

The following inexpensive items can greatly reduce engine friction and improve combustion and carburetion efficiency of any car.

1. A new molybdenum oil additive (Auto-Moly) will reduce engine friction and wear as much as 66%.
2. A low cost, imported compression sealant will stop compression-power leaks in one application.
3. An air bleed carburetor adjustment needle will improve air-gas mixture . . . guaranteeing better combustion and gas economy.

*"I'm a fast driver and my tires never lasted long . . . your "common sense" tire tips have saved me nearly $100 this year."* — Karl Keeler

### Tested Theories Give Results!

A few simple theories developed at the grueling yearly mileage meets, can help you get up to 5 more miles per gallon:

1. *Buy your Gas at night* or early in the morning before the sun's heat expands the gas in station tanks. Save 2% to 4%!
2. *Don't drive* with a near-empty gas tank . . . fuel vaporizes and escapes through the air vent.
3. *Drive slowly* the first few blocks after starting. A cold engine uses twice as much gasoline.

*"I'm a salesman and drive hundreds of miles every week. Believe me, it means a lot to get 29 miles per gallon.* —J. Tobin

### "OPEN SESAME" TO A 66% CUT IN CAR EXPENSES

I've mentioned just a few of the hundreds of money saving tips developed and proved by these automotive engineers and world famous speed champs. *You* can now benefit from their knowledge and experience. *Learn how to:* Use one oil filter element for a lifetime . . . Use an inexpensive solvent to dissolve all carbon and reduce oil waste . . . Save up to $300 when selling your used car . . . Convert your car to a 150 m.p.h. sports car . . . Get "High Test" performance from *regular* gas . . . Easily double your braking power! DON'T PAY FOR NEEDLESS REPAIRS . . . "Fix It Yourself" and save at least $100 this year. *Learn how to:* Determine FAIR repair charges . . . Fix your leaky radiator and save $15 . . . "bump out" fender dents and save up to $35.

### Only This Famous Book Reveals All

THE NEWHOUSE 1953 SPEED, POWER & ECONOMY HANDBOOK . . . is the most authentic, complete and fully illustrated book of its type ever published. See for yourself the quick, easy, step-by-step photo illustrations that reveal the outstanding speed, power and economy secrets of the 20th Century. 50 fascinating chapters of clear, simple information on every phase of car operation, economy, upkeep and repair. Yours to TRY FOR 10 DAYS IN YOUR OWN HOME AT OUR EXPENSE.

Send no money. This book is sent to you C.O.D. Merely pay postman $1.98 plus a few pennies postage when it is delivered. If it does not live up to all the claims, just return it and your $1.98 will be refunded.

### All 3 Free!

These $1.75 value books are yours to keep even if you return the big Speed & Power book.

1. ECONOMY DRIVING MANUAL . . . 48 pages of selected economy hints and info. on top auto products. (Reg. 50c value)
2. HIGH PERFORMANCE EQUIPMENT . . . Pictures & lists 1,000 tested power and economy parts and accessories. (Reg. 25c value)
3. FAMOUS "HOW" BOOKLET . . . Reveals secret of how some drivers can and do get up to 150 m.p.g. (Reg. $1 value)

COPYRIGHT 1952

### Free Membership

GANE ECONOMY CLUB

**GANE ECONOMY CLUB**
**To Book Purchasers**

SEND YOUR BOOK ORDER TODAY and receive your Life Membership Card in the great Gane Economy Club. Enclosed with your card will be your *Free* gas coupons . . . *Free* credit checks . . . *Free* credit memorandums . . . *Free* gift certificates . . . *Free* money saving coupons and *Free* trial & premium offers. Other benefits enjoyed by present ½ million members include a *Free* subscription to the Club Newspaper . . *Free* catalogs showing merchandise which club members can "Buy Without Money". Members have saved many hundreds of dollars through club benefits and privileges.

**ORDER YOUR SPEED AND POWER MANUAL TODAY . . . AND RECEIVE YOUR "LIFE MEMBERSHIP CARD" PLUS GIFT & FREE OFFER CERTIFICATES AT ONCE!**

**NEWHOUSE AUTOMOTIVE**
**Dept. PSB-12**
**San Gabriel, California**

**SEND NO MONEY! Mail FREE GIFT Coupon Now!**
**NEWHOUSE AUTOMOTIVE, Dept. PSB-12**
**San Gabriel, California**

**Rush me the Newhouse SPEED, POWER, & ECONOMY HANDBOOK for NO RISK EXAMINATION. I agree to pay postman on arrival $1.98 plus postage. If not completely satisfied I will return it within 10 days for a full refund.**

**Also send me ABSOLUTELY FREE THE 3 handbooks: "Economy in Driving," "High Performance Equipment" and the "Famous How Booklet." These I will keep as a FREE GIFT even if I return the Newhouse Handbook. Also, don't forget to include my Economy Club Membership and FREE gift certificates.**

Name.....

(Please Print in Pencil)

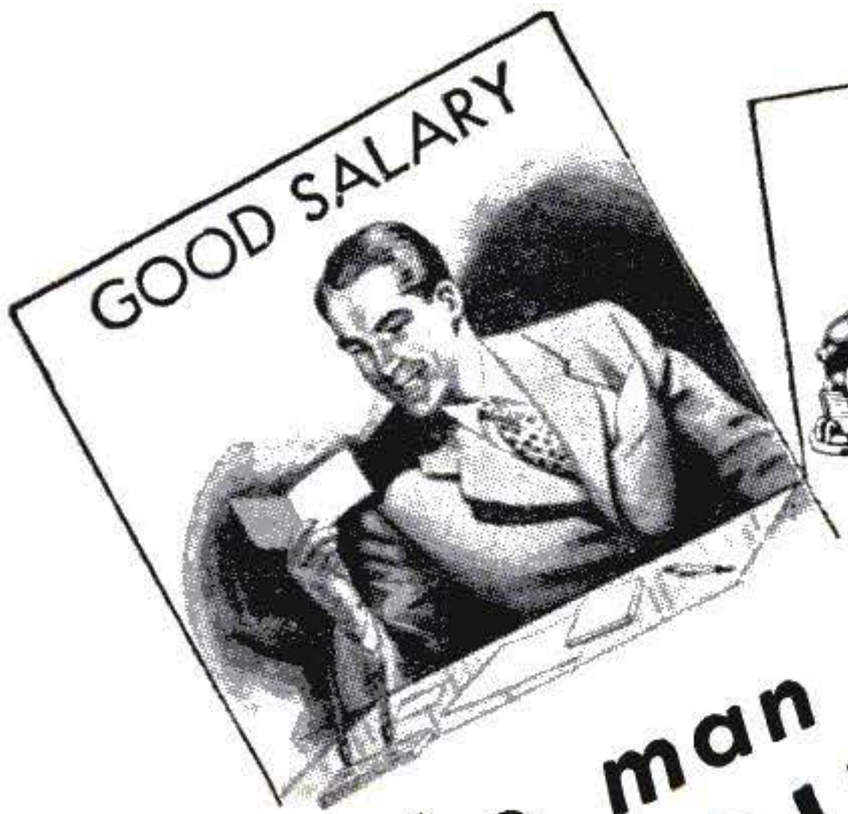
Address.....

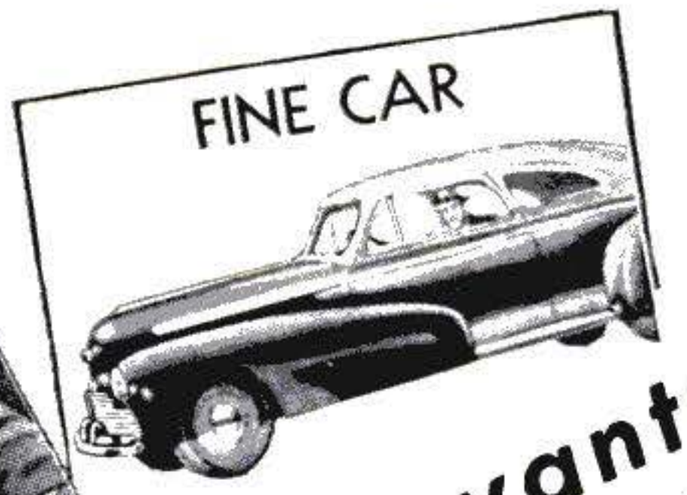
City..... Zone..... State.....

☐ SAVE MORE! If you send $1.98 with coupon, we pay all postage charges. Same money-back guarantee.

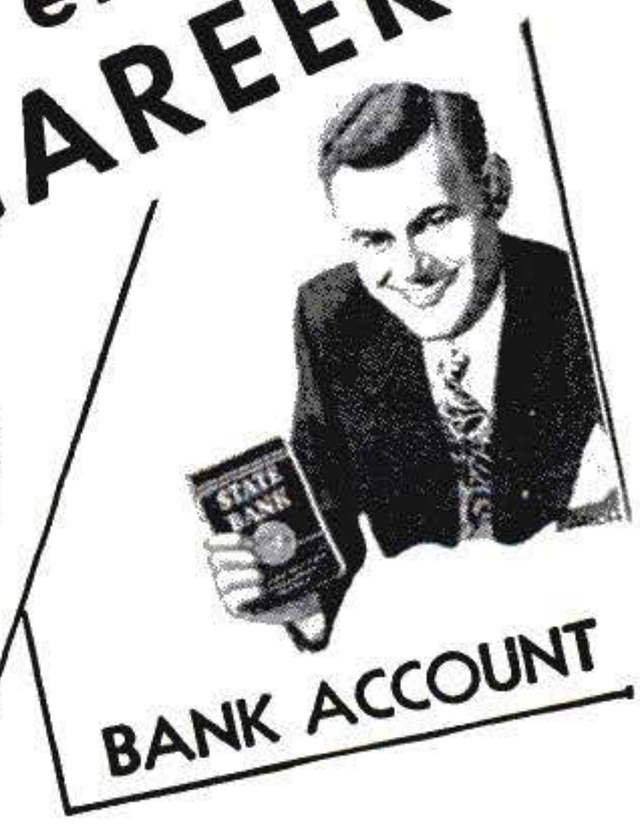


Copyrighted material




# To the man who wants to enjoy an ACCOUNTANT'S CAREER




IF you're that man, here's something that will interest you.

Not a magic formula—not a get-rich-quick scheme—but something more substantial, more practical.

Of course, you need something more than just the desire to be an accountant. You've got to pay the price—be willing to study earnestly, thoroughly.

Still, wouldn't it be worth your while to sacrifice some of your leisure in favor of interesting home study—over a comparatively brief period? Always provided that the rewards were good—a salary of $4,000 to $10,000?

An accountant's duties are interesting, varied and of real worth to his employers. He has *standing!*

Do you feel that such things aren't for you? Well, don't be too sure. Very possibly they *can* be!

Why not, like so many before you, investigate LaSalle's modern Problem Method of training for an accountancy position?

Just suppose you were permitted to work in a large accounting house under the personal supervision of an expert accountant. Suppose, with his aid, you studied accounting principles and solved problems day by day—easy ones at first—then more difficult ones. If you could do this—and could turn to him for advice as the problems became complex — soon you'd master them all.

That's the training you follow in principle under the LaSalle Problem Method.

**Over 3500 Certified Public Accountants among LaSalle alumni**

You cover accountancy from the basic Principles right up through Accountancy Systems and Income Tax Procedure. Then you add C. P. A. Training and prepare for the C. P. A. examinations.

As you go along, you absorb the principles of Auditing, Cost Accounting, Business Law, Statistical Control, Organization, Management and Finance.

Your progress is as speedy as you care to make it—depending on your own eagerness to learn and the time you spend in study.

Will recognition come? The only answer, as you know, is that success *does* come to the man who is really *trained*. It's possible your employers will notice your improvement in a very few weeks or months. Indeed, many LaSalle graduates have paid for their training—with increased earnings—before they have completed it! For accountants, who are trained in organization and management, are the executives of the future.

## Write For This Free Book

For your own good, don't put off investigation of *all* the facts. Write for our free 48-page book, "Accountancy, The Profession That Pays." It'll prove that accountancy offers brilliant futures to those who aren't afraid of serious home study. We'll also include "Ten Years' Promotion in One"—a book which has helped many men. Send us the coupon *now*.

**Other LaSalle Opportunities**

- ☐ Higher Accountancy
- ☐ C.P.A. Coaching
- ☐ Bookkeeping
- ☐ Law: LL.B. Degree
- ☐ Business Management
- ☐ Salesmanship
- ☐ Traffic Management
- ☐ Foremanship
- ☐ Industr'l Management
- ☐ Stenotypy (Machine Shorthand)

## LASALLE EXTENSION UNIVERSITY
### A CORRESPONDENCE INSTITUTION

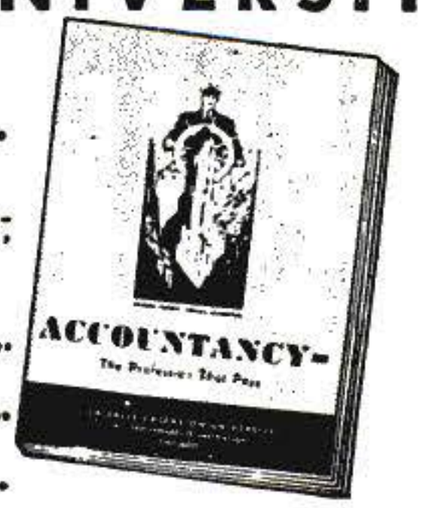
**417 S. Dearborn St. Dept. 1283-HR Chicago 5, Ill.**

I want to be an accountant. Send me without obligation, "Accountancy, the Profession that Pays"—also "Ten Years' Promotion in One."

*Name*.....*Age*.....

*Address*.....

*City, Zone & State*.....






Copyrighted material

# Letters

### When the Left-Hand Drive Started

Pictures with your recent articles on antique cars suggest that most, if not all, American automobiles built before 1910 had the steering wheel on the right-hand side. Is this true? And, if so, did Americans in those days drive on the left side of the road, as the British still do?

PETER STEINHOBEL,
Eagles Crag, Union of South Africa.

*The first U.S.-made cars, apparently in imitation of European models, were built with right-hand drive—even though traffic in this country, from the earliest horse-and-wagon days, has always kept to the right. In 1908 Henry Ford, recognizing the advantage of placing the driver where he could get a straighter and closer look at oncoming traffic, gave the first Model T a left-hand drive. By 1913 and '14 his competitors were all switching over.*

### How to Make a Cabin Howl

My heart aches for PSM reader Hugh F. Kirkwood [Letters, Oct. p. 20] who built a cabin in the woods and then couldn't get the wind to howl around it properly. I had the same problem a few years ago when I had a

camp in a place called Skunks Misery near Augusta, Me. Solved it by placing several glass jugs just under the cabin, on the windward side, and boring some holes through the sill so the wind could blow across the tops of the jugs. Just one jug won't do it, but six of different sizes produce a very decent shriek.

JOHN STERLING, Sanford, Fla.

### Seemed Like a Good Idea

There's nothing really new under the sun, as witness the note about self-lighting cigarettes in the PS News & Notes page of your October issue.

Back in 1930 a similar cigarette was marketed in this area: The tip had a thin band of composition similar to the head of a safety match; the package had a safety striking surface.

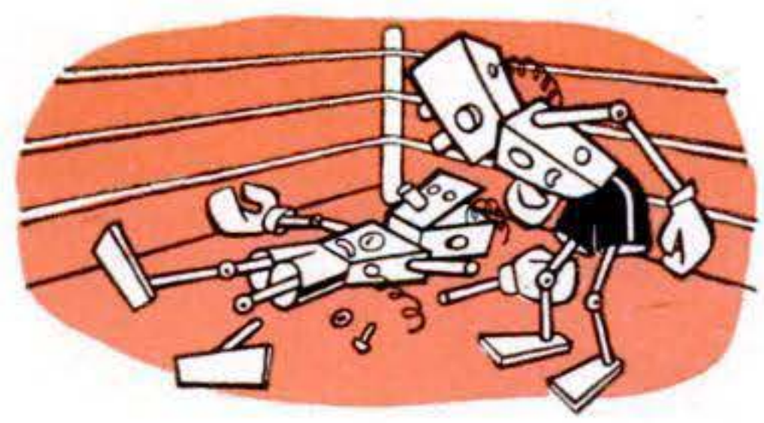
Scrape the tip on the striking surface and you had a light all right; but the first few drags tasted terrible. It didn't stay on the market long.

JOHN B. NEWLIN, Crawfordsville, Ind.

### Science Vs. Sportsmanship

Re: "Mechanical Sports Are Coming." Oct., p. 97—

When such devices take the place of



humans, then where is the sportsmanship?

So why stop with robot officials—why not robot players?

EDWARD MURRA JR., Ironwood, Mich.

### In Defense of MGs

Wilbur Shaw writes about the MG [Sept., p. 155] as if he doesn't consider it quite dignified to drive one. I too was a little concerned about joining the MG club, because I am past 50. But when I see a retired Army Officer of 65 accepting a "drag" invitation from a 22-year-old sergeant; when an Army nurse—a captain—finishes third in a sponsored MG dirt-track race; when a college student complains that his parents bought him an MG but consistently leave him their big car—then I feel I am not out of place.

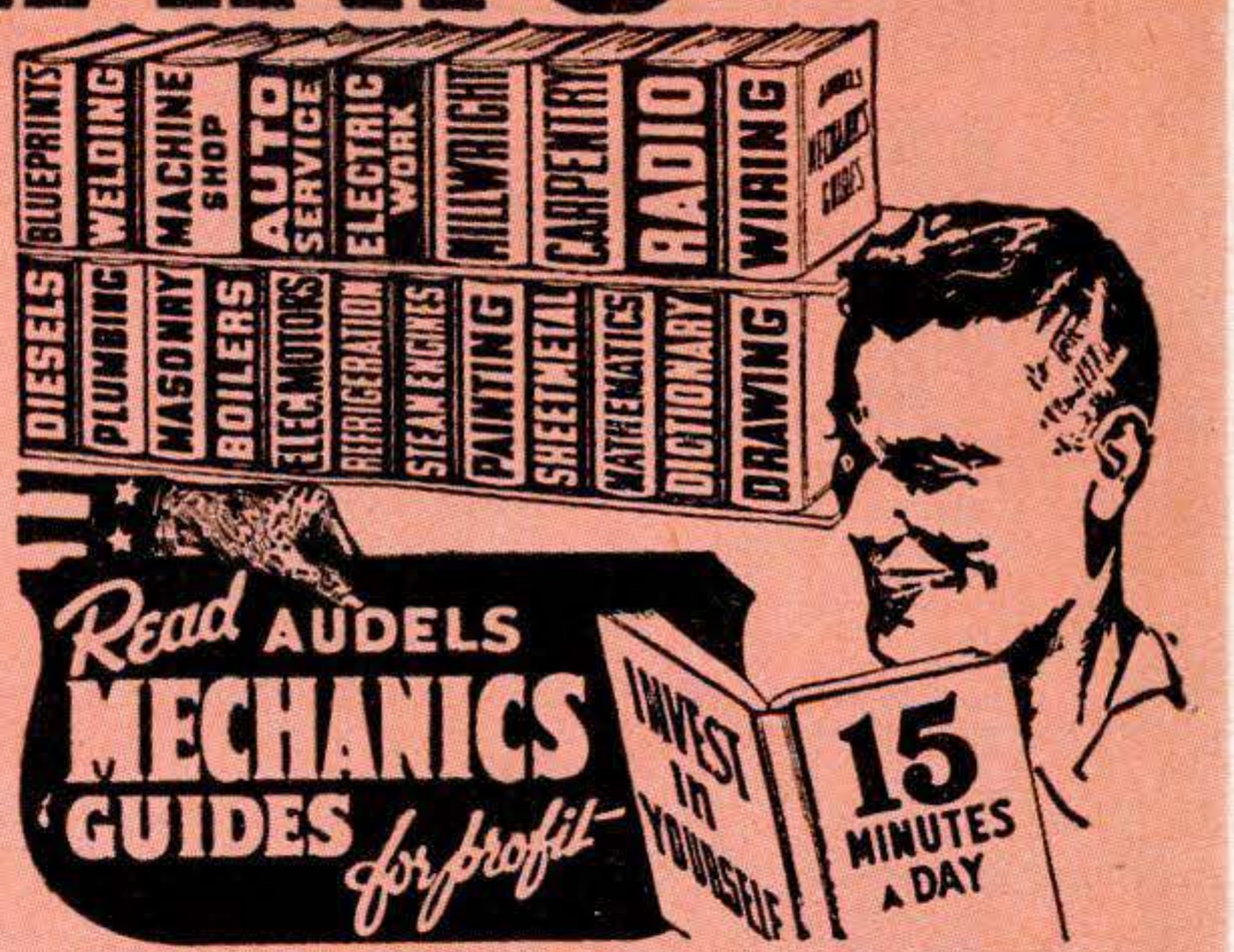
GENE BROWN, San Antonio.

Why do a lot of guys love the MG? Some people like spinach, and some don't. I like spinach—and MGs as well. And perhaps



Copyrighted material

# WHAT Every MECHANIC Wants to Know




## AUDELS AUTO MECHANICS GUIDE . $4

A practical quick ready reference book for auto mechanics, service men, operators & owners. Explains theory, construction & servicing of modern motor cars, trucks, buses & auto type Diesel engines. 1800 pages, fully illustrated. 73 chapters. Indexed. A standard book for mechanics. New Hydraulic & Fluid drive covered.

## AUDELS TRUCK & TRACTOR GUIDE . $4

A Shop Companion—1299 Pages—78 Chapters Fully Illus. Covers Gas & Diesel Motors—Construction—Operation—Maintenance—Repair—Service Operations. Trouble Shooting—Engine Tune-up—Carburetor Adjusting—Ignition Timing—Brakes—Complete Service of all Parts. Includes Farm Tractors, Fire Trucks and Buses.

## AUDELS MACHINIST & TOOLMAKERS HANDY BOOK . . . . . $4

Covers modern machine shop practice in all its branches. Tells how to set up & operate lathes, screw and milling machines, shapers, drill presses & all other machine & hand tools. 1600 pages, fully illustrated. Indexed. 5 sections. 1—Modern Machine Shop Practice. 2—Blue Print Reading & How to Draw. 3—Calculations & Mathematics for Machinists. 4—Shop Physics. 5—How to Use the Slide Rule. 60 chapters. Easy to read and understand. A shop companion that answers your questions.

## AUDELS WELDERS GUIDE . . . . . $1

A concise, practical text on operation & maintenance of all welding machines for all mechanics. Over 400 pages, illustrated. Covers all methods of electric and acetylene welding including airplane work.

## AUDELS BLUE PRINT READING . . . . . $2

For Mechanics & Builders. Covers all types of blue print reading including ship & airplane. 416 pages, fully illustrated.

## AUDELS MATHEMATICS & CALCULATIONS FOR MECHANICS . $2

Mathematics for home study or reference. 700 pages, 550 illus. Practical mathematics from beginning. How to figure correctly. Easy, correct methods covering complete review. Illus. & Indexed.

## AUDELS SHEETMETAL HANDY BOOK $1

Practical inside information. Fundamentals of Sheet Metal Work. 388 pages. Illustrated. 11 sections. Clearly written. Essential & important facts, figures, pointers in everyday language. Ref. Index.

## AUDELS SHEETMETAL PATTERN LAYOUTS . . . . . $4

Developed by Experts for Sheet Metal Workers, Layout Men & Mechanics. A Practical Encyclopedia in 10 Sections, size 7 x 10 x 2 —1100 Pages—350 Layouts—1000 Illustrations. 1001 Key Facts. Fully indexed for ready reference in answering your layout problems. Covers all phases of sheet metal work including Pattern Cutting, Pattern Development & Shop Procedure.

## AUDELS PLUMBERS & STEAMFITTERS GUIDES—(4 Book Set) . . . . . $6

A Practical Trade Assistant & Ready Reference. Explains in plain language & by clear illustrations, diagrams, charts, graphs, pictures principles of modern plumbing practice including Pipe Fitting and Air Conditioning. 4 Vols.—1670 Pages—3642 Diagrams & Illustrations. Each Vol. Sold Separately, $1.50 a Vol.

## AUDELS OIL BURNER GUIDE . . . . . $1

384 Pages Covering Installation, Servicing & Repairs All Types Domestic & Industrial Burners. Illustrated. Highly Endorsed.

## AUDELS CARPENTERS & BUILDERS GUIDES—(4 Book Set) . . . . . $6

A practical illustrated trade assistant on modern construction for carpenters, joiners, builders, mechanics and all woodworkers. 4 vols., 1600 pages, 3700 illustrations. Fully indexed. Each volume Sold Separately, $1.50 a vol.

## AUDELS ELECTRIC MOTOR GUIDE . . $4

Practical Information Covering Construction, Control, Maintenance & Wiring Hookups of All Types Electric Motors also Armature Winding. 1000 Pages Fully Illustrated & Indexed.

## AUDELS PRACTICAL ELECTRICITY . $4

A key to a practical understanding of Electricity. For maintenance engineers, electricians & all electrical workers. 1440 Pages, 2600 Illus. Covers important electrical information in handy form—including wiring for Light & Power. Indexed.

## AUDELS RADIOMANS GUIDE . . . . . $4

A key to the practical understanding of radio including Frequency Modulation, Television, etc. Aircraft & Marine Radio. For radio engineers, servicemen, amateurs. 914 Pages, 633 Illustrations & Diagrams. Photos. Review Questions & Answers. Reference Index.

## AUDELS TELEVISION SERVICE MANUAL . . . . . $2

Tells How to Solve T.V. Troubles. 384 Pages on Installing, Trouble Shooting & Repairing. Shows Good Receiver Adjustment—How to Install Aerials—Explains Color Systems. 225 Illus. & Diagrams covers Operating Principles of Modern T.V. Receivers.

**AUDEL, Publishers, 49 W. 23 St., N. Y. 10, N. Y.**

## AN AUDEL GUIDE IS A GOOD FRIEND!

**Step Up Your Own Skill with the Practical Facts and Figures of Your Trade. Save time and money with right methods, short cuts, labor saving ideas. CHECK NOW! You can look over any Audel Guide in your home. Start the Easy Payments if satisfied.**

**Check NOW!**

*Audels List Of Time Tested Practical Handy Books For Mechanics That Will Answer Your Questions — Highly Endorsed*

**MAIL THIS TODAY**

YOUR OPPORTUNITY

—CUT HERE—

# MAIL ORDER

**AUDEL, Publishers, 49 W. 23 St., NEW YORK 10, N. Y.**

**Please send me postpaid for FREE EXAMINATION books marked (x) below. If I decide to keep them I agree to mail $1 in 7 Days on each book or set ordered and further mail $1 monthly on each book or set until I have paid price, otherwise I will return them.**

- ☐ MACHINISTS HANDY BOOK, 1650 Pages . . . $ 4
- ☐ WELDERS GUIDE, 400 Pages . . . . . 1
- ☐ BLUE PRINT READING, 416 Pages . . . . . 2
- ☐ MATHEMATICS & CALCULATIONS, 700 Pages. 2
- ☐ SHEET METAL PATTERN LAYOUTS, 1100 Pages 4
- ☐ SHEET METAL WORKERS HANDY BOOK, 388 Pgs. 1
- ☐ MECHANICAL DRAWING GUIDE, 160 Pages . . 1
- ☐ MECHANICAL DRAWING & DESIGN, 480 Pages 2
- ☐ AUTOMOBILE MECHANICS GUIDE, 1800 Pages 4
- ☐ TRUCK & TRACTOR GUIDE, 1299 Pages . . . 4
- ☐ DIESEL ENGINE MANUAL, 575 Pages . . . . 2
- ☐ AIRCRAFT WORKER, 240 Pages . . . . . 1
- ☐ TELEVISION SERVICE MANUAL, 384 Pages . . 2
- ☐ RADIOMANS GUIDE, 914 Pages . . . . . 4
- ☐ ELECTRONIC DEVICES, 216 Pages . . . . . 2
- ☐ ELECTRIC MOTOR GUIDE, 1000 Pages . . . . 4
- ☐ ELECTRIC WIRING DIAGRAMS, 272 Pages . . 1
- ☐ ELECTRICIANS EXAMINATIONS, 250 Pages . . 1
- ☐ ELECTRIC POWER CALCULATIONS, 425 Pages. 2
- ☐ HANDY BOOK OF ELECTRICITY, 1440 Pages . . 4
- ☐ ELECTRIC DICTIONARY, 9000 Terms . . . . . 2
- ☐ ELECTRIC LIBRARY, 7000 Pages (12 Book Set) 18
- ☐ MARINE ENGINEERS HANDY BOOK, 1258 Pgs. 4
- ☐ SHIPFITTERS HANDY BOOK, 250 Pages . . . 1
- ☐ REFRIGERATION & Air Conditioning, 1280 Pgs. 4
- ☐ MILLWRIGHTS & MECHANICS GUIDE, 1200 Pgs. 4
- ☐ POWER PLANT ENGINEERS GUIDE, 1500 Pages 4
- ☐ ENGINEERS & FIREMANS EXAMS, 525 Pages . 1
- ☐ PUMPS, Hydraulics & Air Compressors, 1658 Pgs. 4
- ☐ ENGINEERS LIBRARY (3 Book Set) . . . . . 9
- ☐ MECHANICAL DICTIONARY, 950 Pages . . . . 4
- ☐ GARDENERS & GROWERS GUIDES (4 Book Set) 6
- ☐ CARPENTERS & BUILDERS GUIDES (4 Book Set) 6
- ☐ PLUMBERS & Steamfitters Guides (4 Book Set) 6
- ☐ MASONS AND BUILDERS GUIDES (4 Book Set) 6
- ☐ PAINTERS & DECORATORS MANUAL, 450 Pgs. 2
- ☐ HOUSE HEATING GUIDE, 1000 Pages . . . . . 4
- ☐ OIL BURNER GUIDE, 384 Pages . . . . . 1

Name _____

Address _____

Occupation _____

Employed by _____

S12



Copyrighted material

# I'll Train You RADIO-

J. E. SMITH, President, National Radio Institute, Washington, D. C., has trained more men for Radio-Television than any other man. Established 1914

## Practice SERVICING or COMMUNICATIONS with Kits I Send

As part of either my Communications Course or my Servicing Course I send you many kits of parts that give you PRACTICAL EXPERIENCE. They "bring to life" the principles in my easy-to-understand, illustrated lessons. Shown at left is some of the equipment you build. Build valuable Multitester, use it to make many tests, earn extra money in spare time fixing neighbors' Radios. Build many circuits common to both Radio and Television. All equipment is yours to keep. Mail coupon for my FREE DOUBLE OFFER! My free 64-page book describes and pictures equipment I send.

## Television Is Today's Good Job Maker

In 1951 over 15,000,000 homes had Television sets, more are being sold every day. Television now reaches from coast to coast. 108 TV stations are already operating, over 1800 more have been authorized. This means new jobs, more jobs, better pay for trained men. The time to act is NOW! Start learning Radio-Television servicing or communications.

## Make Extra Money in Spare Time While Learning

Keep your job while training. Many NRI students make $5, $10 and more a week extra fixing neighbors' Radios in spare time. I start sending you special booklets that show you how to service sets the day you enroll. Multitester you build helps discover and correct Radio troubles, gives PRACTICAL EXPERIENCE on circuits common to Radio and TV.

## I Trained these Men at Home

**Laborer Finds Success in Radio-TV**

"I was a laborer with no future. Now I have a position that pays well. My spare time servicing pays good money, too. Thanks to NRI."—Robert Ford, Johnstown, Pa.

**Switched to TV Servicing**

"I recently switched from studio work and am now holding a position as TV service technician. Enjoy my work more and more."—Norman Ward, Ridgefield Park, N. J.

**Paid for Course, Car in Spare Time**

"By the time I graduated I had paid for my course, a car and testing equipment. I can handle any job in Radio-TV."—E. J. Streitenberger, New Boston, Ohio.

**$10 to $15 Week Spare Time**

"Four months after enrolling, was able to service Radios . . . averaged $10 to $15 a week spare time. Now have full time business."—W. Weyde, Brooklyn, N. Y.

**Employed as Transmitter Operator**

"A former employer recommended NRI training to me. Now employed as transmitter operator in Harrisburg."—Albert Herr, New Cumberland, Penna.



Copyrighted material

# AT HOME for Good Jobs in TELEVISION

## There is Success-Good Pay-Security for You in America's Fast Growing Industry

### NRI Training Leads to These Jobs in RADIO-TELEVISION

**BROADCASTING**
Chief Technician
Chief Operator
Power Monitor
Recording Operator

**SERVICING**
Home and Auto Radios
Television Receivers
P.A. Systems

**MANUFACTURING**
Design Technician
Service Manager
Tester
Research Assistant

**SHIP AND HARBOR RADIO**
Chief Operator
Radiotelephone Operator
Assistant Operator

**GOVERNMENT RADIO**
Operator in Army, Navy, Marine Corps
Airways Operator
Forestry Dispatcher

**AVIATION RADIO**
Transmitter Technician
Airport Transmitter Operator

**TELEVISION**
Pick-up Operator
Television Technician
Remote Control Operator
Service and Maintenance Technician

**POLICE RADIO**
Transmitter Operator
Receiver Serviceman

**Control Operator, Station WEAN**

"Received my License and worked on ships. Now with Station WEAN. NRI Course is as complete as any radio course can be." —Raymond E. Arnold, Rumford, L. I.

**Lost Job, Now Has Own Shop**

"Got laid off my machine shop job which was best thing that ever happened to me as I opened a full time RADIO shop." —Ernest T. Slate Corsicana, Texas.

DO YOU want good pay, a job with a bright future, security? Would you like to have a profitable business of your own? If so, find out how you can realize your ambition in the fast-growing RADIO-TELEVISION industry. Even without Television, the industry is bigger than ever before. 105 million home and auto radios, 2900 Radio Broadcasting Stations, 108 TV Stations with 1800 more now authorized. Expanding use of Aviation and Police Radio, Micro-Wave Relay, Two Way Radio for buses, taxis, etc., are making opportunities for Servicing and Communications technicians and FCC Licensed Operators.

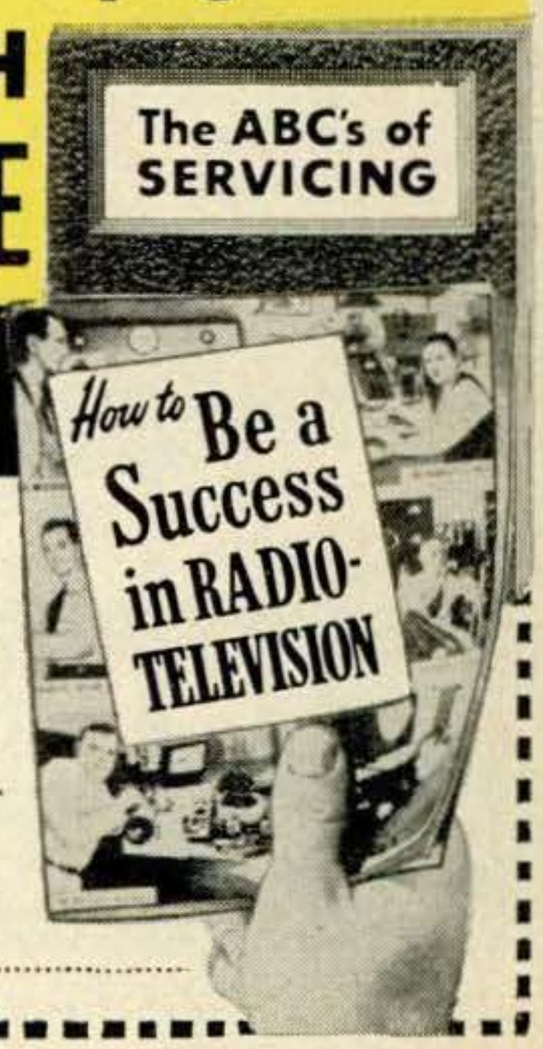
### My Training Includes Television

You get practical experience by working on circuits common to both Radio and Television. My graduates are filling jobs, making good money in both Radio and Television. Many NRI trained men start their own Radio and Television servicing business with capital earned in spare time. Let me show you how you can be your own boss; earn $5, $10 a week extra even while still learning. Now is the time to get ready for success in TV. Mail coupon now.

### Find Out What Radio-Television Offers You

What will YOU be doing one year from today? Decide now that you are going to know more and earn more. ACT NOW. Send the coupon below NOW for my FREE DOUBLE OFFER. You get Actual Servicing Lesson. Also my 64-page Book, "How to Be a Success in Radio-Television." Read what my graduates are doing, earning, see equipment you practice with at home. Mail coupon now. Send in envelope or paste on postal. J. E. SMITH, President, Dept. 2NB, National Radio Institute, Washington 9, D. C. Our 39th year.

## Actual Lesson and 64-page Book BOTH FREE




## MAIL THIS NOW!

Mr. J. E. Smith, President, Dept. 2NB,
National Radio Institute, Washington 9, D. C.

Mail me Sample Lesson and 64-page Book, "How to Be a Success in Radio-Television." (No salesman will call. Please write plainly.)

Name.....Age.....

Address.....

City.....Zone.....State.....



Copyrighted material

# YOU SHAVE CLEANER IN ½ THE TIME

**"Get it over with" fast with Schick Injector, world's only razor specially engineered to give you "Twice Over" smoothness with "Once Over" Shaving!**

No movable parts that get out of adjustment, no detachable parts that can be dropped or misplaced. Specially designed to "fit" your face—under nose, around lips!

**Today, get your complete razor kit:**

- ★ Gold-Plated Razor
- ★ 12 Scalpel-sharp "Gold Pack" Blades
- ★ Handy Travel Case

Big $1.75 Value. Now Only **98¢**

## Only razor offering these 4 advantages

©1952, Eversharp Inc 350 Fifth Ave., N. Y. C


there's a negative reason: A lot of guys, myself included, are fed up with the gaudy behemoths that Detroit is foisting on the public and, as a rejection, are buying a neat, small, practical, efficient package, which the MG is.

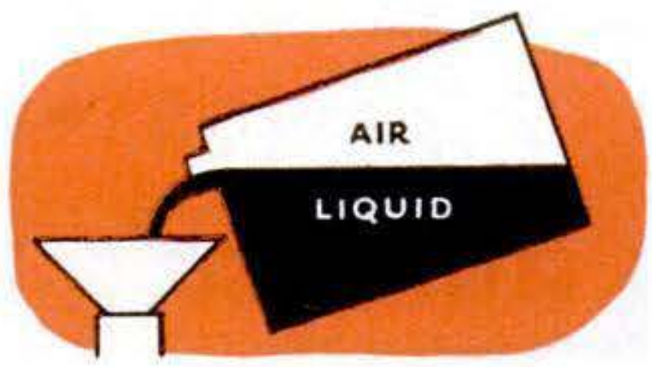
RALPH DAVENPORT, Sidney, N. Y.

### How to Pour Antifreeze

You certainly fumbled that procedure for pouring antifreeze [Oct., p. 199]. I just wouldn't want to be around if the mechanic dribbled alcohol on the manifold. It's explosive—remember?

E. W. FREDRICKSON, Bridgeport, Conn.

Do it this way. Instead of having the




spout at the bottom, turn it to the top. The antifreeze won't dribble.

C. L. BOSSMEYER, Rockford, Ill.

### Imported Ideas?

I read with interest the piece on the development of the motorcycle in your October issue [p. 172]. It is quite true that the Harley-Davidson folks have got a good bike in the model K. But it makes me laugh to see its features heralded as the latest thing. In truth, every feature has been tested and proved through years of use in British and German machines.

The four-speed foot shift has been in use from 'way-back-when . . .

J. ROGER TALBOT, Port Credit, Ont.

*We're looking forward to a communique from Moscow about this. The Russians will undoubtedly insist that they built the first motorcycle and were responsible for every improvement made since then.*

In your article on the Harley-Davidson I spotted a mistake. A caption on page 175 says the "open crankcase shows . . . four-speed transmission." This is actually the timing case, the gears exposed being the camshaft gears.

DAVID LACCIA, Philadelphia.

*You're right, of course; and, since we knew better, we can only plead carelessness.*



Copyrighted material

LEARN

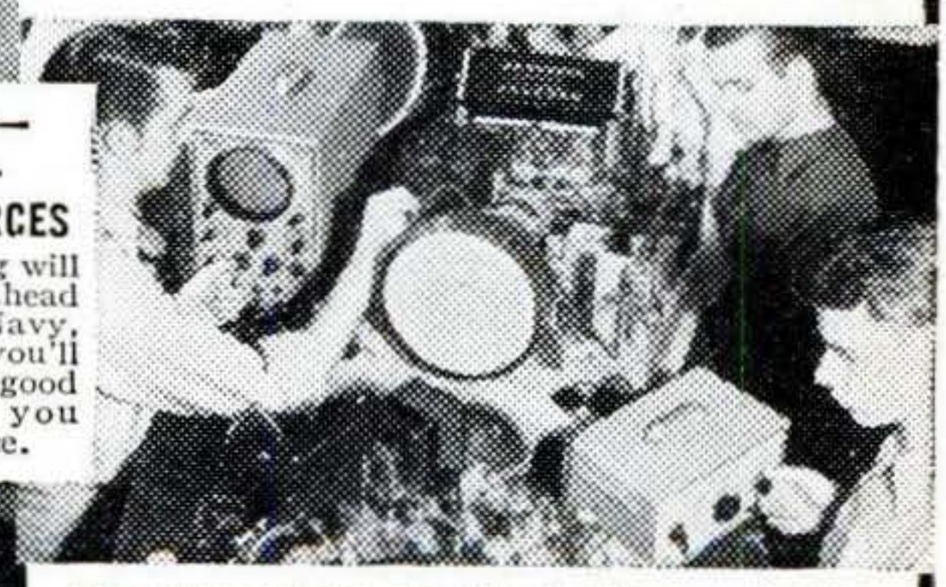
# ELECTRICITY AND ELECTRONICS

ON REAL EQUIPMENT

IN THE GREAT SHOPS OF COYNE

## RADIO-TELEVISION

**Plays a Vital Roll in Nation's Defense**



**HIGHER RANK— HIGHER PAY— IN ARMED FORCES**

Coyne Training will help you forge ahead in the Army, Navy, Air Force. And you'll be all set for a good future when you leave the service.

The tremendous growth of this new field is almost unbelievable. TV has been given the "go-ahead" in 1227 new communities, with 1845 new stations to be built. Unusual opportunity to get in on ground floor. RADIO—TELEVISION and ELECTRONICS are vital to our Defense Program. And they offer a world of opportunities for a real future when the emergency is over. **Train quickly** on actual equipment **at Coyne** by practical-technical methods. Get big Free Book today.

# ELECTRICITY—

## The Power Behind Our Defense Program

**A great opportunity field and vital to Defense. Thousands of trained Electrical and Electronics men needed in good jobs with a real future when the emergency is over. Why be satisfied with a "no future" job? Get Free Book that tells how thousands have prepared quickly for Electricity and Electronics at Coyne.**

## TRAIN QUICKLY AT COYNE FOR VITAL FIELDS

ELECTRICITY–RADIO-TELEVISION–ELECTRONICS–VITAL in Industry and Armed Forces. TRAIN QUICKLY for better rating, if drafted—vital job in Industry, if not. Trained men whether 16 or up to 50 needed. Many men with physical handicaps can qualify. Prepare now for steady, well paid, essential jobs in A FIELD THAT ALSO OFFERS A REAL FUTURE WHEN THE EMERGENCY IS OVER.

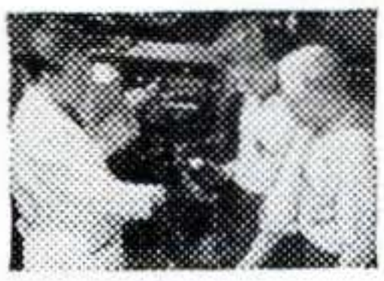
### WE TRAIN YOU IN CHICAGO

We do not teach by mail. All training is given in our Great Training Shops in Chicago, plus necessary theory. No advanced education or previous experience needed.

### APPROVED FOR VETERANS— FINANCE PLAN FOR NON-VETS

Non-vets enroll now, pay most of tuition after graduation. If you need part-time work to help out with living expenses while **at Coyne**, we'll help you get it. Special plan for men of Draft Age.

**1** You are TOLD the how and why of each job.



**2** You're shown how to do typical jobs by trained instructors.

**3** You DO practical job YOURSELF on equipment.

## Mail Coupon for Big FREE BOOK

Whether you prefer Electricity or Television-Radio, train on actual equipment, at Coyne. Fill in and mail coupon TODAY. Paste it on a postcard if you wish. A big fully illustrated booklet and complete details will come by return mail. No salesman will call.

B. W. COOKE, President

**COYNE SCHOOL**

A TECHNICAL TRADE INSTITUTE
CHARTERED NOT FOR PROFIT
Established 1899
500 S. Paulina Dept. 92-73H
Chicago 12, Illinois

ELECTRICITY ★ TELEVISION ★ RADIO ★ REFRIGERATION ★ ELECTRONICS

B. W. COOKE, President
COYNE SCHOOL
500 S. Paulina St., Chicago 12
Dept. 92-73H

Send your BIG FREE BOOK and details of your training offer. This does not obligate me and **no salesman will call.** I am interested in

☐ ELECTRICITY ☐ TELEVISION-RADIO

NAME.....

ADDRESS.....

CITY.....STATE.....



Copyrighted material

**AMERICAN SCHOOL**
**Dept. G946, Drexel at 58th, Chicago 37, Ill.**

Without obligation, please send me FREE and postpaid, full particulars about the subject checked below.

- ☐ Accounting
- ☐ Air Conditioning
- ☐ Architecture & Building
- ☐ Automotive Technician
- ☐ Better Foremanship
- ☐ Bookkeeping
- ☐ Business Management
- ☐ Contracting
- ☐ Diesel Technician
- ☐ Drafting—Building Trades
- ☐ Drafting—Machine Trades
- ☐ Electrical Engineering
- ☐ Electricity—Practical
- ☐ Electronics—Industrial
- ☐ High School Courses
- ☐ Machine Shop Operations
- ☐ Mathematics & Slide Rule
- ☐ Mechanical Engineering
- ☐ Plastics Engineering
- ☐ Plumbing—Practical
- ☐ Private Secretary
- ☐ Refrigeration
- ☐ Retail Merchandising
- ☐ Salesmanship—Outside
- ☐ Sheet Metal Work
- ☐ Tool Making

NAME..... OCCUPATION.....

HOME ADDRESS..... AGE.....

CITY..... STATE.....

**START NOW by checking, filling in and mailing this coupon. You'll get full information... No cost, No obligation!**

• **Today,** choose the career you want and take the first easy step toward your goal. Learn how you can get the training that can put you in the bigger pay class. Find out how, in spare time at home, you can qualify for work you prefer, promotions and bigger pay checks. Or if you are already in the work you like, find out how you can climb faster.

***Backed by 55 Years of Training Know-How***

Since 1897 American School has helped many thousands toward success by providing specialized training for commercial and technical advancement. Its program for **you** has been prepared by experts in the subject you select and the school will help you every step of the way. In time you might otherwise waste you can prepare at home and really GO on the **right** road.

***Don't Delay YOUR Start***

Give serious thought to the list of training courses listed above. Pick the opportunity that interests you, check it and add your name and address. (Check more than one if you are undecided which appeals most.) Then clip and mail the coupon. Full information will be supplied without cost or obligation.

THE SOONER YOU START, THE SOONER YOUR GOAL CAN BE REACHED


### Hot Exhaust

Will you please inform me as to the approximate temperature of the exhaust from an automobile when the motor is idling and when operating at high speed.

R. F. WINTERS, Covington, Ky.

*We passed this question to the Chrysler engineering division, which says:*

*"In a recent laboratory test, the temperature at the heads of the exhaust valves averaged 500° F. during idle operation at 500 r.p.m. At 3,000 r.p.m., under full load, the average temperature was 1,400°."*

### Wrong-Way Weather Vane

In a recent POPULAR SCIENCE you carried an article about a weather vane on top of a TV antenna. It's a good idea to leave off the compass directions if you have a rotatable antenna. Rotating the antenna would throw someone off course.

Down here we get two stations in Boston and one in Providence, R. I., and to get really good reception you need this kind of antenna.

ALBERT G. BROCK, Nantucket, Mass.

### Rugged Arresters

How can I tell whether a lightning arrester is working properly after years of exposure? The bolts are corroded . . .

E. H. SWARTLEY, Alpine, Tenn.

*Underwriters Laboratories says it would cost far more to test an individual arrester than to buy a new one. Very high voltages are needed for a proper test on most types.*

*If an arrester is cracked or broken, you should replace it. But approved arresters are made and tested for long service out of doors, so age alone needn't worry you. Neither should corrosion on the outside of the terminals.*

### How Big Are Tires?

Just for the heck of it, I put a big pair of calipers to a 6.50-16 tire the other day. Imagine my surprise when the calipers showed a cross-section diameter much greater than 6.50 inches. Was the tire mis-marked?

JOHN SIKORSKY, Chicago

*The section diameter of most tires is a little more than the designated size: 6.50 actually measures 6.8 in. In the new low-pressure tires, however, size designation is a true indication of section diameter.*



Copyrighted material

# INVENTORS

Learn how to protect your invention. The U. S. Patent Laws provide that any new and useful art, machine, article of manufacture, or composition of matter, or any new and useful improvement thereof, may be patented if the act of invention is involved. Therefore, every inventor with a valuable invention should take advantage of the Patent Laws and proceed for patent protection in order to safeguard his rights.

A patent gives the inventor the exclusive right to prevent others from making, using, or selling the invention claimed in the patent for a period of seventeen years.

The Patent Laws were enacted for the benefit of the inventor to give him protection for the features of his invention which are patentable. These features must be properly and concisely set forth and claimed in a formal application for patent, in order to comply with the requirements of the Patent Laws. For that reason, unless the inventor is familiar with patent matters, he should engage a competent registered patent attorney or agent to represent him. We are registered to practice before the U. S. Patent Office and are prepared to serve you in the handling of your patent matters.

A specially prepared booklet entitled "Patent Guide for the Inventor", containing detailed information with respect to patent protection and procedure, together with a "Record of Invention" form will be promptly forwarded to you without obligation upon request.

---

## CLARENCE A. O'BRIEN & HARVEY JACOBSON

*Registered Patent Attorneys*

22-M DISTRICT NATIONAL BUILDING

WASHINGTON 5, D. C.




Copyrighted material

Copyrighted material

# INVENTORS

If you believe that you have an invention, you should find out how to protect it. The first step is to have a search made of the prior pertinent U. S. patents. If a report on this search indicates that the invention appears patentable you can apply for a patent, and the specifications and claims should be prepared.

The firm of McMorrow, Berman & Davidson, with offices in Washington, D. C., is qualified to take the necessary steps for you. We can make a preliminary search on your invention, advise you whether we think it can be patented, and prepare your application for patent.

Unless you are fully familiar with the U. S. Patent Laws, we recommend that you engage the services of a Registered Patent Attorney to protect your interests. The patent laws are *your* laws. A patent gives you the right to prevent others from making, using or selling the invention claimed in your patent for a period of 17 years.

Use these patent laws for your protection. Investigate whether your invention can be patented. If you have what you believe to be an invention, we suggest that you have this firm make a search for you.

*Send for a copy of our Patent Booklet entitled "How To Protect Your Invention," containing information about patent protection and patent procedure. Along with this we will also send you an "Invention Record" form, for your use in writing down and sketching details of your invention. We will mail them promptly. No obligation. They are yours for the asking.*

## McMORROW, BERMAN & DAVIDSON

*Registered Patent Attorneys*

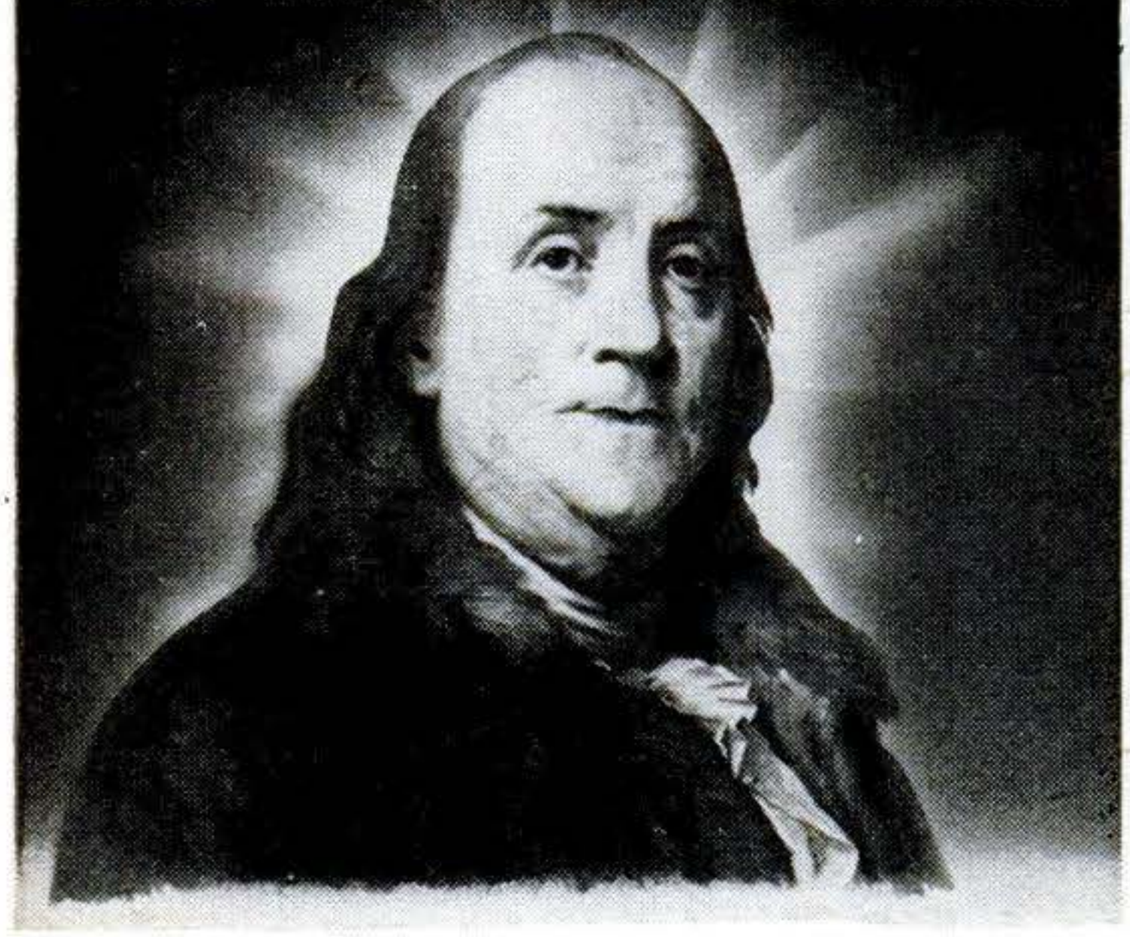
**PATENTS • COPYRIGHTS • PATENTS**

142-D VICTOR BUILDING, WASHINGTON 1, D. C.




Copyrighted material

# WHAT SECRET POWER DID THIS MAN POSSESS?



BENJAMIN FRANKLIN
(A Rosicrucian)

WHY was this man great? How does anyone —man or woman—achieve greatness? Is it not by mastery of the powers within ourselves?

Know the mysterious world within you! Attune yourself to the wisdom of the ages! Grasp the inner power of your mind! Learn the secrets of a full and peaceful life!

Benjamin Franklin—like many other learned and great men and women—was a Rosicrucian. The Rosicrucians (NOT a religious organization) first came to America in 1694. Today, headquarters of the Rosicrucians send over seven million pieces of mail annually to all parts of the world. Write for YOUR FREE COPY of "The Mastery of Life"—TODAY. No obligation. No salesmen. A non-profit organization. Address: Scribe M.E.T.

**THIS BOOK FREE!**

## The ROSICRUCIANS
SAN JOSE • (AMORC) • CALIFORNIA

**SEND THIS COUPON**

Scribe M.E.T.
The ROSICRUCIANS (AMORC)
San Jose, California

Please send me the *free* book, *The Mastery of Life,* which explains how I may learn to use my faculties and powers of mind.

Name_____

Address_____

City_____

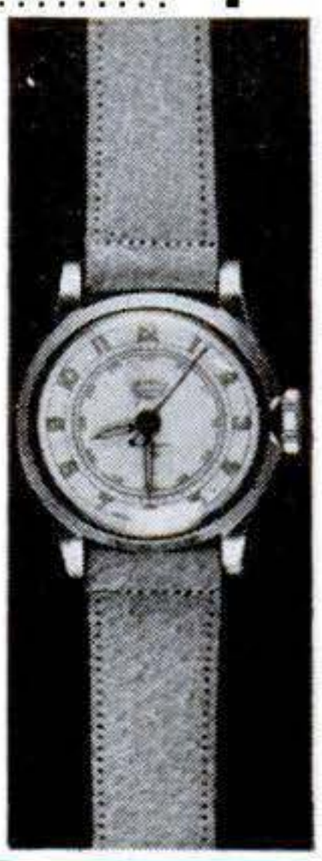
# RUGGED WATCHES FOR ACTIVE BOYS 4.99 PLUS TAX

## "Mechanical Brain" SPORTS WATCH

Accurately made CHRONOGRAPH. Measures distance, times sports, auto races, photography, lab experiments. A dependable wrist watch for boys 8 to 80. Has 2 push buttons, unbreakable crystal, night-glo numbers & hands. Leather band. Gift p'k'd. No. 236. Fully tax paid..... **4.99**

**JEWELED SHOCK RESIST WATCH**

Ideal for over-active boys! Special staff shock absorber defies breakage, even if dropped or worn during sports. Has luminous dial, sweep second hand, unbreakable crystal, Jewelled Swiss movement, leather band, No. 260. Your tax paid..... **4.99**



● **UNLIMITED GUARANTEE** ●

exclusive of parts! Send check or m.o. for prompt free delivery. C.O.D.'s plus post. 5 Day Money Back Guarantee. Gift packaged. Add $1 if metal band is desired. Rush order now!

**Thoresen's**
Dept. 7-N-200,
140 Fifth Ave. New York 11, N. Y.



# MONEY for MEN ALL DATA FREE

THE PLASTEX Industry needs manufacturers on small scale and for big production of Lamp and Clock Stands. Art Goods and Novelties in Plastex and Marble imitation. Experience unnecessary. ½c material makes regular 10c store sellers. Rubber moulds furnished for speed production. Small investment brings good returns. We are now placing big chain store orders with manufacturers. Ambitious men have chance for real prosperity. Our Free booklet will interest and benefit you.
PLASTEX INDUSTRIES, Dept. 2, 3400 Third Ave., New York 56, N. Y.

## FIREARMS & SWORDS

You don't want to miss our new thrill-packed catalog. Fascinating background and illustrations of 1300 authentic pieces. Exceptional values in hard-to-find items. For your 120 page catalog #28 simply send 50c to cover postage and handling with your name and address.

**ROBERT ABELS, Box PS, 860 Lexington Ave., New York 21, N. Y.**



# WATCHMAKING
## FREE Sample Lesson

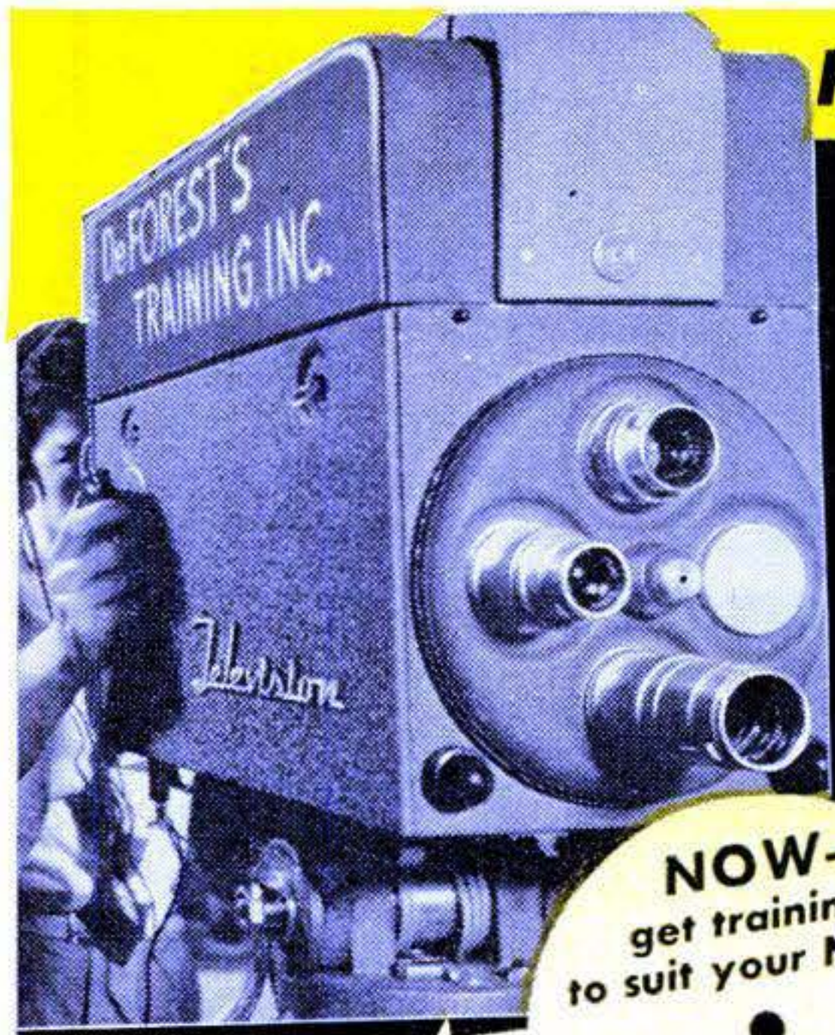
Shows how to clean watches by hand or machine. It's fun . . . profitable too. An exciting hobby or fascinating career. Chicago School of Watchmaking will train you in professional watch repairing at home or in resident school. Learn modern methods. No experience needed. Send coupon today! No obligation.

**CHICAGO SCHOOL OF WATCHMAKING**
1608 N. MILWAUKEE AVE., DEPT. 4122, CHICAGO 47, ILL.
**SEND FREE SAMPLE LESSON** ☐ Veteran

Name.....
Address.....
City.....Zone....State.....




Copyrighted material




**NOW...from D.T.I.'s MILLION DOLLAR TRAINING CENTER**

# Learn to master TELEVISION

## RADIO - ELECTRONICS

## by getting EVERYTHING YOU NEED!

America's amazing multi-billion dollar Television field now offers you a chance of a lifetime to get started toward a grand job or your own business. With TV station limit now raised from 108 to 2053, Television is headed for almost every community. Mail coupon today. See how you may prepare to cash in on the coming TV BOOM.

NOW— get training to suit your NEEDS

TAKE YOUR CHOICE

## Come to D.T.I.'s great CHICAGO LABORATORIES

***...one of the Nation's FINEST!***

Now, in the heart of the nation's TV Center, you can get all of your preparation in D.T.I.'s big, modern, wonderfully equipped training laboratories. Loads of commercial equipment and ample, well qualified instructors help you get a thorough, practical preparation in the SHORTEST POSSIBLE TIME. Part time student Employment Service can help you pay your way while in training.

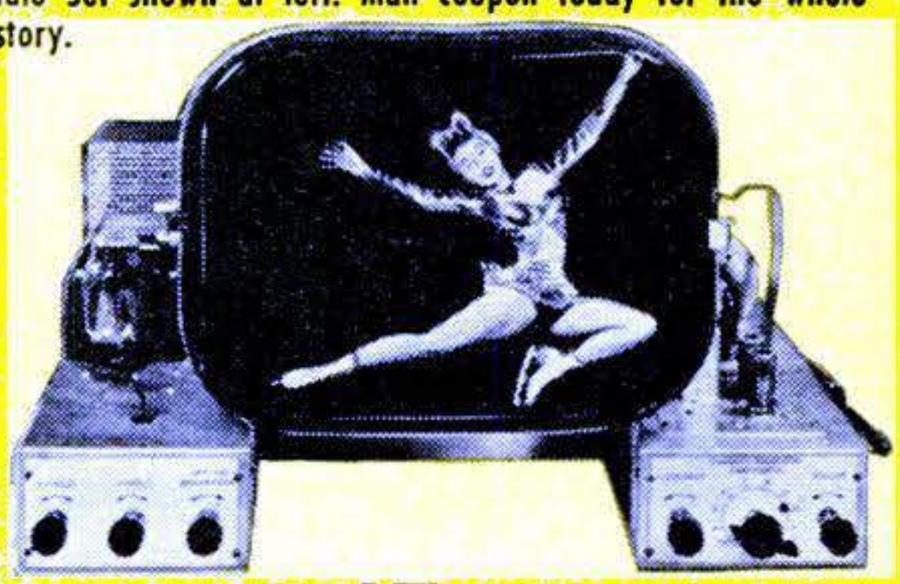
### *EMPLOYMENT SERVICE*

As soon as you complete either the Chicago Laboratory or Home Training, you'll find D.T.I.'s grand Employment Service ready to help you start earning real money. Get full facts. Mail coupon today.

## Get ALL of your training AT HOME!...*including setting up your own HOME LABORATORY*

If unable to come to D.T.I.'s big Chicago laboratories, we'll provide you with one of today's most complete and effective combinations of major home training aids. Not only will you get (1) well illustrated lessons and (2) the unique and wonderful aid of instructive HOME MOVIES, but you'll also (3) set up your own HOME LABORATORY

You'll get and keep 16 big shipments of electronic parts—the same type of basic equipment used by students in our wonderfully equipped Chicago laboratories. You'll work over 300 interest-gripping experiments for the practical experience you need. This even includes building and keeping the valuable commercial test equipment and Super Radio Set shown at left. Mail coupon today for the whole exciting story.



## Build a 17 inch TV set

**After completing foregoing training, and for a moderate added cost, you may build and keep this top quality, 17 inch TV Receiver—an optional feature for valuable added experience.**

## Use 16 mm. MOVIES

**Only D.T.I. provides you with the loan of visual training movies of home to help you master important basic points faster . . . easier . . . better!**

***"ONE OF AMERICA'S FOREMOST TELEVISION TRAINING CENTERS"***

***Established 1931***

**89 WAYS TO EARN MONEY IN TELEVISION RADIO-ELECTRONICS**

MILITARY SERVICE! If you're subject to military service, the information we have for you should prove very helpful. Mail coupon today.

**ACT NOW! MAIL COUPON TODAY**
***Get this publication FREE!***

**DeFOREST'S TRAINING, INC.** PS-12-1
**2533 N. ASHLAND AVE., CHICAGO 14, ILLINOIS**

I would like your Opportunity News Bulletin showing "89 Ways to Earn Money In Television-Radio-Electronics"; also, complete facts about the training opportunity made possible by your organization.

Name_____ Age____

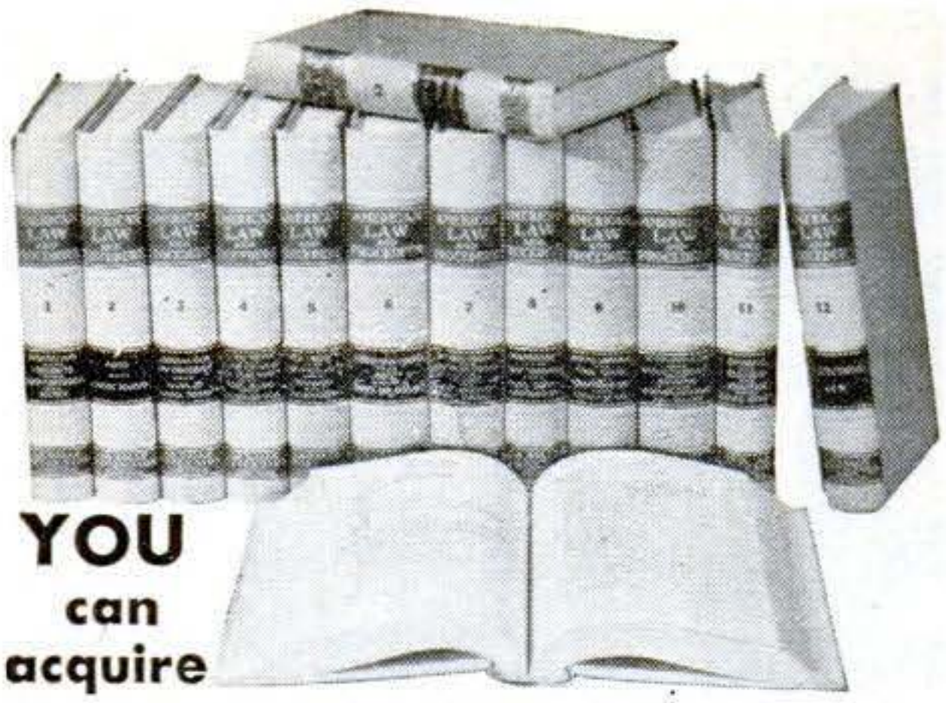
Address_____ Apt.____

City_____ Zone_____ State_____

**De FOREST'S TRAINING, INC.**
AFFILIATED WITH
**De VRY *Technical* INSTITUTE**
CHICAGO 14, ILLINOIS



Copyrighted material



**YOU can acquire**

# LAW NIGHTS AT HOME! L L.B. DEGREE

LaSalle's famous Law Library—used as reference in many Law libraries and Law offices—has enabled thousands to master Law surprisingly fast, in spare hours at home, for business and professional advancement.

These 14 remarkable volumes, compiled by leading professors and lawyers, cover the whole basic field of Law in condensed, orderly, simplified manner.

You advance rapidly with this great library, plus special lectures furnished. We guide you step-by-step with personalized Problem Method of instruction . . . you *learn by doing*—handling legal problems—not by memorizing rules.

Send for two FREE 48-page booklets, "Law Training for Leadership," and "Evidence," answering questions about Law and its value to you, and telling how LaSalle Law graduates are winning rapid advancement in business and public life. Mail coupon below. No obligation.

**LA SALLE EXTENSION UNIVERSITY**
***A Correspondence Institution***
**417 S. Dearborn St., Dept. 1283L, Chicago 5, Ill.**

Send me your two FREE booklets described above, without obligation.

*Name*_____ *Age*_____

*Street*_____

*City, Zone & State*_____

# 473 MEN WANTED

## As Local Manufacturers of this New Masonry

CAVITEX is today's masonry—colorful, streamlined, scientific. Yet with price appeal to override competition. Size and proportion in direct line with modern architectural trends. Dimensions strictly according to modular standards. All the strength, safety and endurance of masonry at its peak point.

**Outstanding Opportunities For Responsible Operators**

**CAVITEX**

Cavitex can be made locally—of local materials with local labor. Freight and distribution costs are saved. That's why Cavitex can be sold so low, yet still allow 100% or more mark-up on material and labor. We supply basic equipment on easy rental terms. Exclusive privileges in franchise-protected territories. Hundreds of territories open. Write or wire today for "Opportunity, Unlimited"—free. If requested, we will tentatively reserve territory desired.

**W. E. DUNN MFG. CO., 410 W. 24th St., Holland, Mich.**

# Get These NEW, Easiest-to-Install STORM WINDOWS

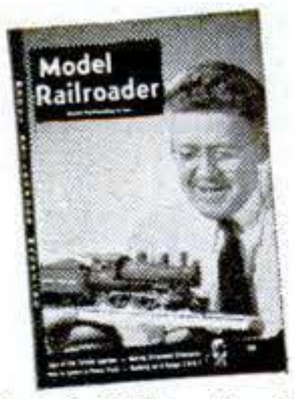
## Save Money! Save Fuel! Keep Rooms Warmer!

**TRANSLUCENT and CLEAR as your window pane. SIMPLE TO INSTALL yet air-tight and effective. Save Fuel, Heat and Money. You apply these plastic storm sheets directly to your window sill on the inside or outside. You only need tape and scissors to get an expert installation.**

**You Can Air Rooms By lifting one corner of Plastic Window and reseal again for a perfect insulation fit. Use Year after Year.**

**Only 83c per window. 6 windows for $4.75. You receive AN EXTRA LARGE SIZE ROLL three feet by 32 feet (36" x 432"). Will fit double windows, casement, picture or bay window by taping together. Waterproof, Air Tight, Economical. Instructions FREE! Roll of Tape For Easy as pie Installation. Enclose check or money order for $4.75 for each roll of 432" (6 window size).**

**IMPERIAL SALES CO.**
**480 LEXINGTON AVE., Dept. W667**
**NEW YORK 17, N. Y.**




# Model Railroading is Fun!

Read about it in picture-packed Model Railroader magazine. **Special Offer!** Send $1 ($1.75 value) for special 3-month subscription plus new 64-page "Introduction to Scale Model Railroading." Limited. Act today!

**Model Railroader Magazine** Dept. 1672 C, Milwaukee 3, Wis.

# How to Make Money in PHOTOGRAPHY

Unique, low-cost LEARN-BY-DOING method and INDIVIDUAL attention trains you quickly at home in spare time. Start making money in photography at once! We show you how. Our **43rd** year. Big FREE colorful book gives full facts. Write TODAY! Resident Training also available.

**NEW YORK INSTITUTE OF PHOTOGRAPHY**
**Dept. 5, 10 W. 33 St., New York 1, N. Y.**

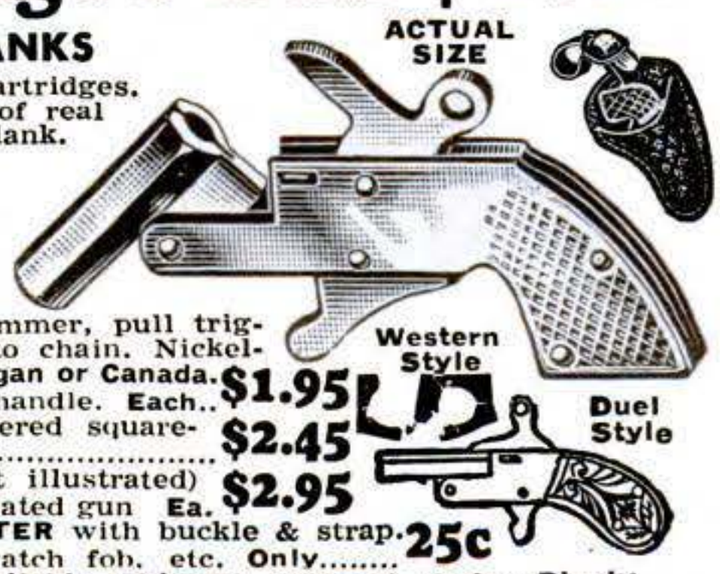
# Real Midget Gun $1.95

**SHOOTS BLANKS**

Midget gun shoots blank cartridges. Precision working model of real gun. Loud as .22 cal. blank. Louder than cap gun.

**Loud Explosion!**

Picture actual size. 1¾-in. long. Easily concealed. Barrel breaks open to load; ramrod ejects cartridge. Cock hammer, pull trigger. Loop for attaching to chain. Nickel-plated. **Not sold in Michigan or Canada.**




**DUEL STYLE.** Engraved handle. Each.. **$1.95**
**WESTERN STYLE.** Checkered square-butt grip. **EACH**..... **$2.45**
**DELUXE WESTERN.** (Not illustrated) Real pearl handles, gold plated gun **Ea.** **$2.95**
**MIDGET LEATHER HOLSTER** with buckle & strap. Attach to belt, use as watch fob, etc. **Only**..... **25c**

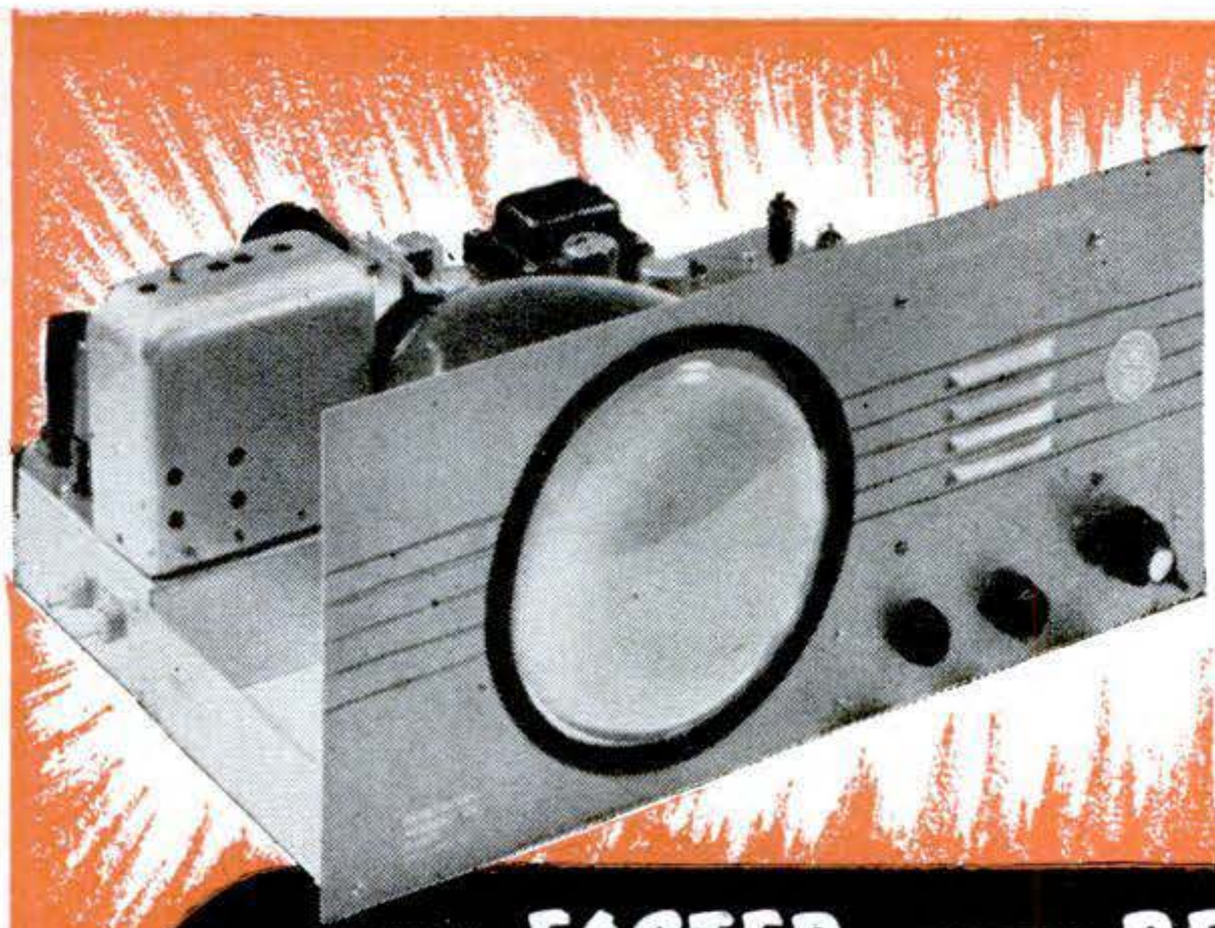
**Ammunition (Not Mailable—Shipped Express) Order Plenty**
**3 Pkges Blank Cartridges $1.00; 6 Pkges. $1.85; 9 Pkges. $2.60. 12 per package. Save by ordering plenty. SHIPPING CHARGES PAID ON DELIVERY.** Cartridges not mailable—must go by express. Pay express charges when package delivered. (About $1.50). **No C.O.D. Send money for goods; pay shipping charges on delivery. Send order to:**

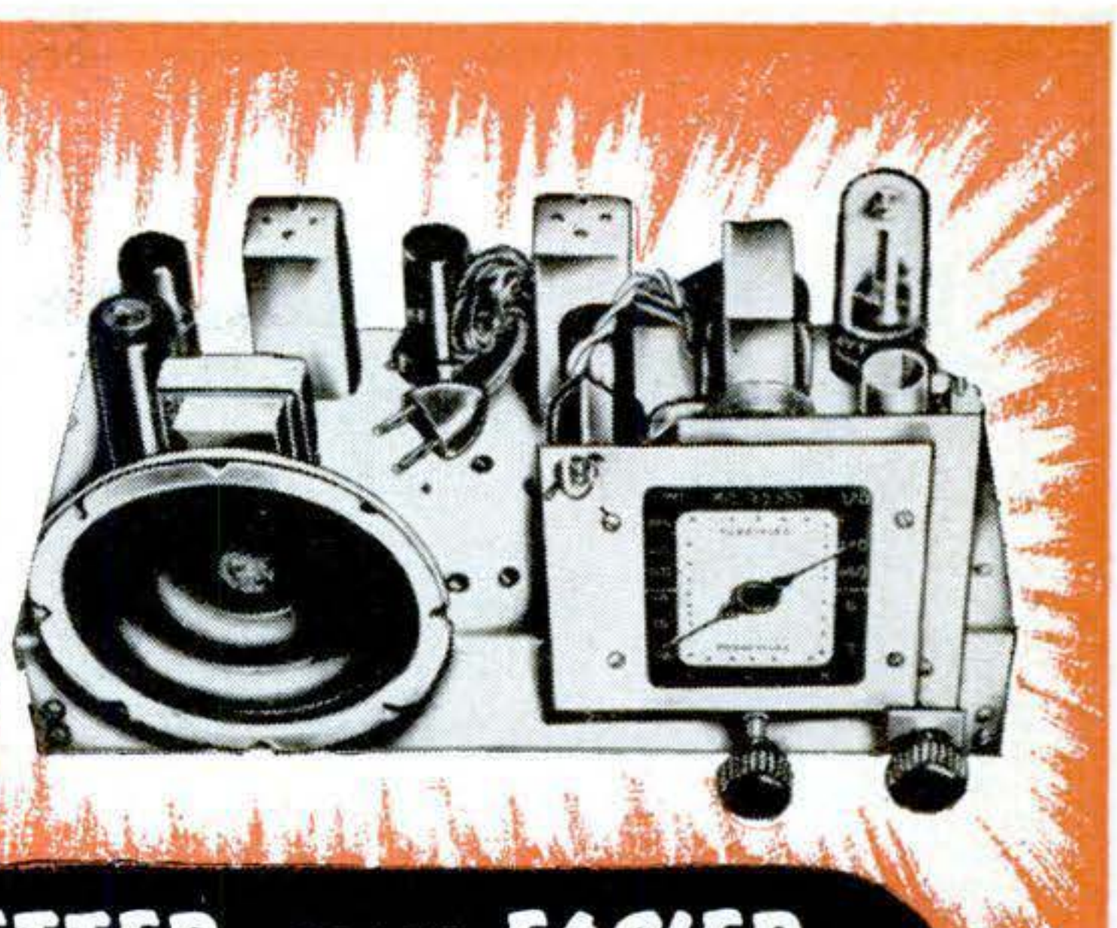
**JOHNSON SMITH COMPANY, Dept. 638, Detroit 7, Mich.**

Send 10c for catalog of 3000 novelties, gadgets, funmakers, etc



Copyrighted material





TRAIN *FASTER* — TRAIN *BETTER* — TRAIN *EASIER*

IN 10 MONTHS — OR LESS — FOR

# RADIO-TELEVISION

**Our 21st Year Training Men for Greater Incomes and Security in Radio-Television**

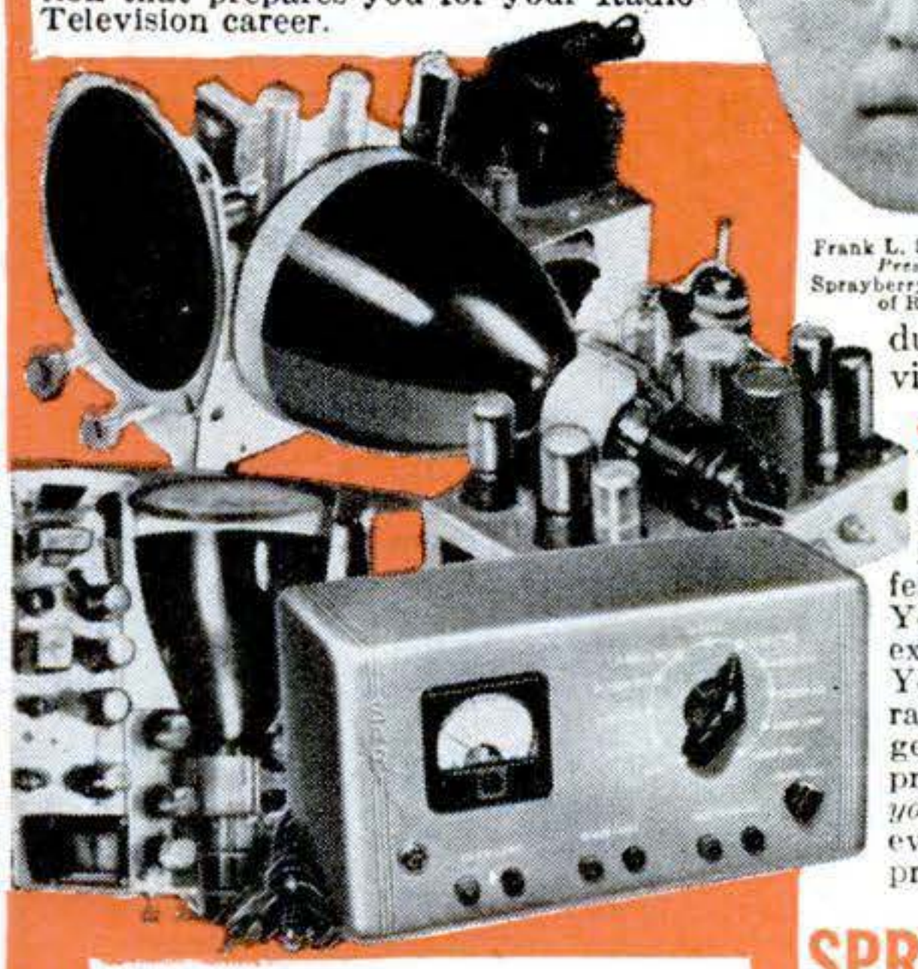
**I SEND YOU**
**18 BIG KITS**
of Radio Television parts and equipment. Much of your training will be actual construction and experimentation . . . the kind of truly PRACTICAL instruction that prepares you for your Radio-Television career.

Frank L. Sprayberry
*President*
Sprayberry Academy of Radio

## NEW! NO OBLIGATION PLAN

### You Have No Monthly Payment Contract to Sign
### Pay For Your Training as You Earn and Learn

You can get into Radio-Television, today's fastest growing big money opportunity field, in *months* instead of years! My completely new "package unit" training plan prepares you in as little as 10 months or even less! *No monthly payment contract to sign—thus NO RISK to you!* This is America's finest, most complete, practical training—gets you ready to handle any practical job in the booming Radio-Television industry. Start your own profitable Radio-Television shop . . . or accept a good paying job. I have trained hundreds of successful Radio-Television technicians during the past 21 years—and stand ready to train you, even if you have no previous experience! Mail coupon and get all the facts — FREE!



**YOU BUILD** the Television set and the powerful superhet radio receiver shown above IN ADDITION to the other test units shown here. (Many are not illustrated.)

**Approved for Veterans under the G. I. Bill**

### Valuable Equipment Included With Training

The new Sprayberry "package" plan includes many big kits of genuine, professional Radio-Television equipment. You perform over 300 demonstrations, experiments and construction projects. You build a powerful 6-tube 2-band radio set, multi-range test meter, signal generator, signal tracer, many other projects. All equipment and lessons are *yours to keep* . . . you have practically everything you need to set up your own profitable Radio-Television service shop.

### Earn Extra Money While You Learn!

All your 10 months of training is IN YOUR HOME in spare hours. Keep on with your present job and income while learning. With each training "package" unit, you receive extra plans and "Business Builder" ideas for spare time Radio-Television jobs. New television stations everywhere, open vast new opportunities for trained Radio-Television Technicians—and those in training. If you expect to be in the armed forces later, there is no better preparation than practical Sprayberry Radio-Television training.

**SPRAYBERRY ACADEMY OF RADIO** 111 NORTH CANAL ST. Dept. 55R Chicago 6, Ill.

***MAIL COUPON TODAY! NO OBLIGATION***

**I invite you to get all the facts —**

***FREE*** **TO YOU 3 BIG RADIO-TELEVISION BOOKS**

Rush coupon for my three big Radio-Television books: "How to Make Money in Radio-Television." PLUS my new illustrated Television Bulletin PLUS an actual sample Sprayberry Lesson —ALL FREE. No obligation and no salesman will call. Mail coupon NOW!

**SPRAYBERRY ACADEMY OF RADIO, Dept. 55R**
**111 North Canal St., Chicago 6, Ill.**

Please rush to me all information on your 10-MONTH Radio-Television Training Plan. I understand this does not obligate me and that no salesman will call upon me. Be sure to include 3 books FREE.

Name..... Age.....

Address.....

City..... Zone..... State.....



Copyrighted material

The NEW Model 50 UTILITY TESTER

# FOR REPAIRING ALL ELECTRICAL APPLIANCES-MOTORS

*an all-around electrical trouble shooter*

- Measures A.C. and D.C. Voltages, A.C. and D.C. Current, Resistances, etc.
- Will measure the current consumption **while the appliance under test is in operation.** The appliance or utility may be plugged directly into the front panel receptacle. A special pair of insulated clip-end leads is included for motors, etc.
- Incorporates a sensitive direct-reading resistance range which will accurately measure all resistances commonly used in electrical appliances, motors, etc. This range will enable continuity checks and tests for shorts and opens.
- Will test thermostats, radio tube filaments, bulbs, fuses, fluorescents, condensers, switches, field coils, circuit breakers, lighting systems, etc.

**Handsome round cornered molded bakelite case 3⅛" x 5⅞" x 2¼". Complete with all test leads and instructions.**

**$13.90**

## SHIPPED ON APPROVAL

**No Money With Order — No C.O.D.**

**Try it for 10 days before you buy. If completely satisfied send $3.90 and pay balance at rate of $2.00 per month for 5 months —No Interest or Carrying Charges Added. If not completely satisfied, return to us, no explanation necessary.**

**SUPERIOR ELECTRONIC CO., INC.**
**Dept. D-43, 227 Fulton Street, New York 7, N. Y.**

Please rush 1 Model 50. I agree to pay $3.90 within 10 days after receipt and $2.00 per month thereafter.

Name.....

Address.....

City..... Zone..... State.....



# EAR NOISES?

If you suffer from those miserable ear noises and are Hard-of-Hearing due to catarrh of the head, write us NOW for proof of the wonderful, palliative relief many people have reported after using our simple home treatment. NOTHING TO WEAR. Many past 70 reported such relief in hearing and ear noises. **SEND NOW FOR PROOF AND 30 DAYS TRIAL OFFER.**

**THE ELMO COMPANY**
**DEPT. 3PS9, DAVENPORT, IOWA**

## MASTER MIND!

**Learn Short-Cut Mathematics**

Juggle figures, do baffling number tricks. Make people gasp at your marvelous *lightning-quick* mind. Multiply 4 figures by 4 figures without using old-fashioned multiplication! Big cloth-bound volume; fully illustrated course.

**Sharpen up Your Brain Power**

Includes worked-out problems, answers, etc. Sensational bargain, only $1.95, postpaid or COD plus postage. Satisfaction guaranteed or refund. Order this amazing "Short-Cut Mathematics" today!

**NELSON-HALL CO.,** 210 S. Clinton St. Chicago 6, Ill.
Dept. 4-MY-1

**$1.95 Complete**



# REAL ESTATE

BE A BROKER

**PAYS BIG! SEND FOR FREE, BIG, ILLUSTRATED CATALOG NOW!** Graduates report making substantial incomes. Start and run **your own business quickly.** Men, women of all ages, learn easily. Course covers Sales, Property Management, Appraising, Loans, Mortgages, and related subjects. **STUDY AT HOME** or in classrooms in leading cities. Diploma awarded. Write TODAY for free book! No obligation.

**FREE BOOK TELLS HOW**

**WEAVER SCHOOL OF REAL ESTATE** (Est. 1936)
Suite 300 Law Bldg. Dept. PS Kansas City, Mo.

**AMAZING NEW POCKET SIZE RADIO**

**NO TUBES, BATTERIES OR ELECTRIC "PLUG-INS" NEEDED. "TUNES IN" MOST LOCAL RADIO STATIONS** with **STATIC-FREE CLEAR TONE.** Has new perma-crystal diode and **TINY SELF-CONTAINED SPEAKER PHONE**—A marvelous real tiny pocket size radio to take with you anywhere you go—**FOR REAL FUN AND ENJOYMENT. GUARANTEED TO WORK** and should last for years! **SEND $1.00** (cash, mo, ck) and pay postman $3.99 C.O.D. postage or send $4.99 for p.p. delivery. **COMPLETE** ready to play. By mail only from:

**MIDWAY COMPANY**
DEPT. PPS-12 KEARNEY, NEBRASKA

**OPPORTUNITIES AHEAD!**
TRAIN FOR A FUTURE IN

# DIESEL

Prepare for the big earning power of **Diesel Trained Men.** Start learning at home, in spare time. UEI's easy, practical training covers all phases of DIESEL engine operation, fuel systems, auxiliary equipment, repairs and maintenance. Also new Scientific Auto Motor Tune-up. After home course, you come to Chicago for actual practice in UEI's modern shop under experienced instructors. GET ALL THE FACTS FREE. WRITE TODAY!

DIESEL DIVISION **UTILITIES ENGINEERING INSTITUTE**
2521 Sheffield Avenue, Dept. DM-17 Chicago 14, Illinois



**HI-SPEED COPE-SAW DRILL-BIT** — It DRILLS SAWS REAMS

**INTERNATIONAL TWIST DRILL CORP.**

## IDEAL AS A XMAS GIFT

DRILL, SAW, REAM . . . metal, pipe, wood, plastic, Transite, etc. Use with any electric drill, slow drill press, lathe or milling machine. Drills own starting hole—upper part of bit is used to cut, saw or ream circles, ovals, squares or scrolls. Easy to operate. Ideal for carpenters, mechanics, electricians, plumbers, hobbyists, many others. Abrasive resistant, high speed steel. Flutes ground from solid. Will withstand severe continuous use without breaking. Resharpened at no charge. Takes place of up to $50 in tools. ¼" diameter, 2" cutting sections, total length 3½". Also available specially designed for wood or metal and in 2⅜" and 1½" lengths. Write for details. Specify all-purpose bit. Shipped same day. Money-back guarantee. Dealer inquiries invited.

SEND CASH, CHECK OR MONEY ORDER

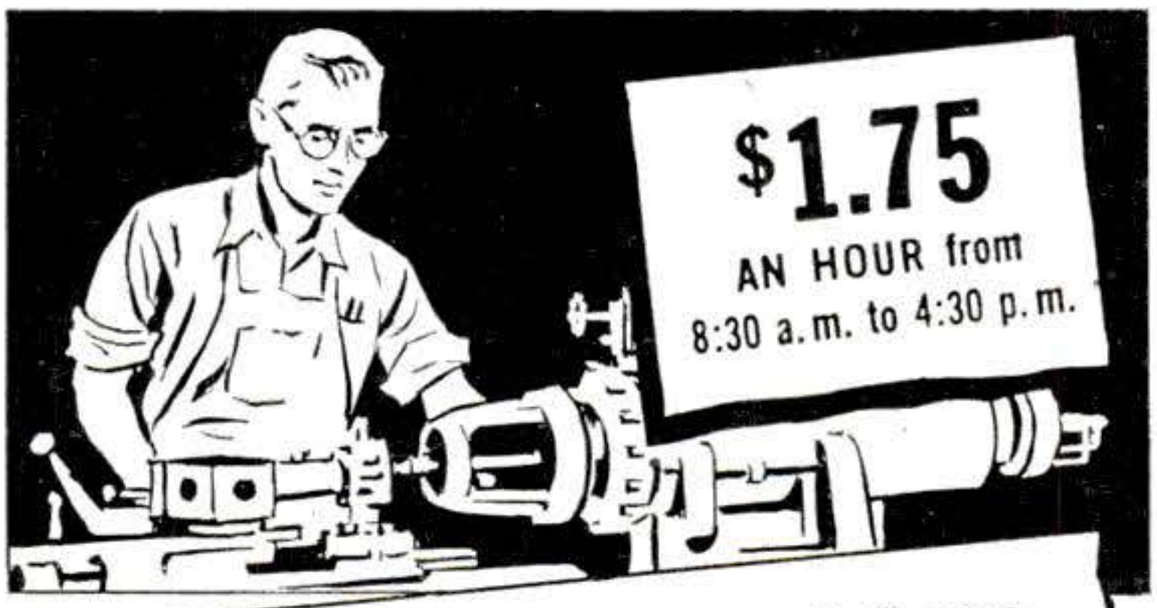
**Manufactured and distributed by:**
**INTERNATIONAL TWIST DRILL CORP.**
618 Wyandotte, Rm. 698, Kansas City 6, Mo.

only $3.95 POST PAID




Copyrighted material

# BOOST YOUR **EARNING** POWER DURING THE **HOURS** THAT **COUNT**



"Every hour I spent on my I. C. S. Course has been worth $95.00 to me! My position, my $7,000 a year income, my home, my family's happiness—I owe it to spare-time training with I. C. S."

EVERY MAIL brings letters like this from men and women who studied I. C. S. courses in their spare time.

What are *you* doing with the hours after supper? Can you afford to let them slip by unimproved when you can easily make them mean so much?

No matter where you live, I. C. S. will come to you. No matter what your handicaps or achievements, whether you make $2,000 or $20,000 a year, I. C. S. has a plan to fit your needs exactly. No matter how limited your previous education, the simply written, fully illustrated I. C. S. textbooks make it easy to learn. No matter what career you may choose, some one of the 391 I. C. S. courses can be your springboard to success.

• • •

**An hour or two a day spent with I. C. S. will prepare you for the position you want in the work you like best. Doubt it? Then put it up to *us* to prove it! Mark and mail this coupon —*now!* We'll send you full information plus *free* book, "How to Succeed."**

## INTERNATIONAL CORRESPONDENCE SCHOOLS

ICS

**BOX 7622-N, SCRANTON 9, PENNA.**

Without cost or obligation, send me "HOW to SUCCEED" and the booklet about the course BEFORE which I have marked X:

**ART**
- ☐ Commercial Art
- ☐ Magazine and Book Illustrating
- ☐ Cartooning
- ☐ Show Card and Sign Lettering
- ☐ Fashion Illustrating

**AUTOMOTIVE**
- ☐ Automobile, Mechanic
- ☐ Auto-Elec. Technician
- ☐ Auto Body Rebuilding and Refinishing
- ☐ Diesel—Gas Engines

**AVIATION**
- ☐ Aeronautical Engineering Jr.
- ☐ Aircraft Engine Mechanic
- ☐ Airplane Drafting

**BUILDING**
- ☐ Architecture
- ☐ Arch. Drafting
- ☐ Building Contractor
- ☐ Estimating
- ☐ Carpenter and Mill Work
- ☐ Carpenter Foreman
- ☐ Reading Blueprints
- ☐ House Planning
- ☐ Plumbing
- ☐ Heating
- ☐ Steam Fitting
- ☐ Air Conditioning
- ☐ Electrician

**BUSINESS**
- ☐ Business Administration
- ☐ Certified Public Accountant
- ☐ Accounting
- ☐ Bookkeeping
- ☐ Stenography and Typing
- ☐ Secretarial
- ☐ Federal Tax
- ☐ Business Correspondence
- ☐ Personnel and Labor Relations
- ☐ Advertising
- ☐ Retail Business Management
- ☐ Managing Small Business
- ☐ Sales Management
- ☐ Salesmanship
- ☐ Traffic Management

**CHEMISTRY**
- ☐ Chemical Engineering
- ☐ Chemistry
- ☐ Analytical Chemistry
- ☐ Petroleum—Nat'l Gas
- ☐ Pulp and Paper Making
- ☐ Plastics

**CIVIL, STRUCTURAL ENGINEERING**
- ☐ Civil Engineering
- ☐ Structural Engineering
- ☐ Surveying and Mapping
- ☐ Structural Drafting
- ☐ Highway Engineering
- ☐ Reading Blueprints
- ☐ Concrete Construction
- ☐ Sanitary Engineering

**DRAFTING**
- ☐ Aircraft Drafting
- ☐ Architectural Drafting
- ☐ Electrical Drafting
- ☐ Mechanical Drafting
- ☐ Structural Drafting
- ☐ Sheet Metal Drafting
- ☐ Mine Surveying and Drafting

**ELECTRICAL**
- ☐ Electrical Engineering
- ☐ Electrician
- ☐ Electrical Maintenance
- ☐ Electrical Drafting
- ☐ Electric Power and Light
- ☐ Lineman

**HIGH SCHOOL**
- ☐ High School Subjects
- ☐ College Preparatory
- ☐ Mathematics
- ☐ Commercial
- ☐ Good English

**MECHANICAL AND SHOP**
- ☐ Mechanical Engineering
- ☐ Industrial Engineering
- ☐ Industrial Supervision
- ☐ Foremanship
- ☐ Mechanical Drafting
- ☐ Machine Design-Drafting
- ☐ Machine Shop Practice
- ☐ Tool Design
- ☐ Industrial Instrumentation
- ☐ Machine Shop Inspection
- ☐ Reading Blueprints
- ☐ Toolmaking
- ☐ Gas—Electric Welding
- ☐ Heat Treatment—Metallurgy
- ☐ Sheet Metal Work
- ☐ Sheet Metal Pattern Drafting
- ☐ Refrigeration

**POWER**
- ☐ Combustion Engineering
- ☐ Diesel—Electric
- ☐ Electric Light and Power
- ☐ Stationary Steam Engineering
- ☐ Stationary Fireman

**RADIO, TELEVISION, COMMUNICATIONS**
- ☐ General Radio
- ☐ Radio Operation
- ☐ Radio Servicing—FM
- ☐ Television
- ☐ Electronics
- ☐ Telephone Work

**RAILROAD**
- ☐ Locomotive Engineer
- ☐ Diesel Locomotive
- ☐ Air Brakes ☐ Car Inspector
- ☐ Railroad Administration

**TEXTILE**
- ☐ Textile Engineering
- ☐ Cotton Manufacture
- ☐ Rayon Manufacture
- ☐ Woolen Manufacture
- ☐ Loom Fixing
- ☐ Finishing and Dyeing
- ☐ Textile Designing

**HOME ARTS**
- ☐ Dressmaking and Designing
- ☐ Cookery
- ☐ Tea Room Management

Name_____ Age_____ Home Address_____

City_____ State_____ Working Hours_____ A.M. to_____ P.M.

Occupation_____

Special tuition rates to members of the Armed Forces. Canadian residents send coupon to International Correspondence Schools Canadian, Ltd., Montreal, Canada



Copyrighted material

# EARN MORE IN DRAFTING

**MORE OPPORTUNITIES *for* EMPLOYMENT and PROMOTION**

"Here I am at work making good money as a draftsman. I'm glad I sent the coupon to Chicago Tech for that Free Trial Lesson and found out how easy it is to learn Drafting in spare time at home. Today I feel secure in my job because the draftsman's work comes first on any new project. And, in addition, draftsmen can't be replaced with machines. What's more, I feel I'm slated for promotion and more pay, because I see so many draftsmen advancing to high-pay jobs."

## LEARN IN SPARE TIME—AT HOME!

***(or at the College in Chicago)***

A few hours of pleasant home study every week—that's all. No interference with your present job. All the tools you need; drawing outfit included. With Chicago Tech's help, you train yourself step by step. This tested method—developed over 48 years of C.T.C. progress—prepares men quickly for good positions in industry.

**FREE INFORMATION — SEND COUPON**

To prove to you how easy it is to learn Drafting at home by the Chicago Tech method, we will send you this FREE TRIAL LESSON. No charge for this lesson, now or later. Fill out and mail coupon, or send post card today.

**CHICAGO TECHNICAL COLLEGE**

**S-220 Tech Bldg., 2000 So. Michigan Ave.**
**Chicago 16, Illinois**

Mail me FREE Lesson with information about big opportunities in DRAFTING.

Name.....Age.....

Address.....

City.....Zone....State.....

# INVENTORS

Your first step—if you consider your invention to be something of importance—is to have a search made of pertinent, prior U. S. patents. If our search report indicates probable patentability of your invention, you may apply for a patent which gives you the right to exclude others from making, using or selling your invention as claimed for a term of 17 years.

**This firm is registered to practice before the U. S. Patent Office and is available to assist in the preparation of the necessary drawings, specification and claims.**

**Ask for a copy of our instructive booklet "Patent Protection for Inventors" and our convenient "Evidence of Invention" form. No obligation.**

**VICTOR J. EVANS & Co.** *Merlin M. Evans*
**REGISTERED PATENT ATTORNEY**
740-P MERLIN BUILDING, WASHINGTON 6, D. C.

# INVENTORS

I shall be pleased to furnish you, upon request, with information relative to patent procedure—without any obligation on your part.

**PATRICK D. BEAVERS**
*Registered Patent Attorney*
937 Columbian Building, Washington 1, D. C.

# *INVENTORS*

**Send for PATENT INFORMATION Book and INVENTOR'S RECORD without obligation**

**GUSTAVE MILLER**
**122PS Warner Building**
**Washington 4, D. C.**

**REGISTERED PATENT ATTORNEY**
**PATENT ATTORNEY & ADVISOR**
**U. S. NAVY DEPT. 1930-1947**
**ASSOCIATE EXAMINER**
**U. S. PAT. OFF. 1922-1929**
**PATENT LAWYER**

# PATENTS

**C. A. SNOW & CO.**
*REGISTERED PATENT ATTORNEYS*
**WRITE FOR INFORMATION TO**
**426 SNOW BUILDING, WASHINGTON 1, D. C.**

# INVENTORS

**Whether an invention is patentable can be substantially determined by a search of the U. S. Patent records. Without obligation, write for information explaining the steps you should take to secure a patent.**

**JOHN N. RANDOLPH**
***Registered Patent Attorney***
**205 Columbian Building Washington 1, D. C.**

# INVENTIONS

## Wanted At Once

If you want to market, or sell, your invention for cash or royalties, **Write for our Free Booklet.** Send no drawings. We also welcome hearing from firms, or private capital, wishing to review inventions in any field. We will be glad to send notice of our clients inventions.

**GLOBAL MARKETING SERVICE**
**1404 Mitchell Street Dept. SD Oakland 1, Calif.**

**When Writing To Advertisers**

**Please Mention Popular Science**

# INVENTORS

*IF YOU WISH TO PROTECT YOUR INVENTION,* You should take steps to protect it by a U. S. Patent. Write me for "INVENTION RECORD" FORM

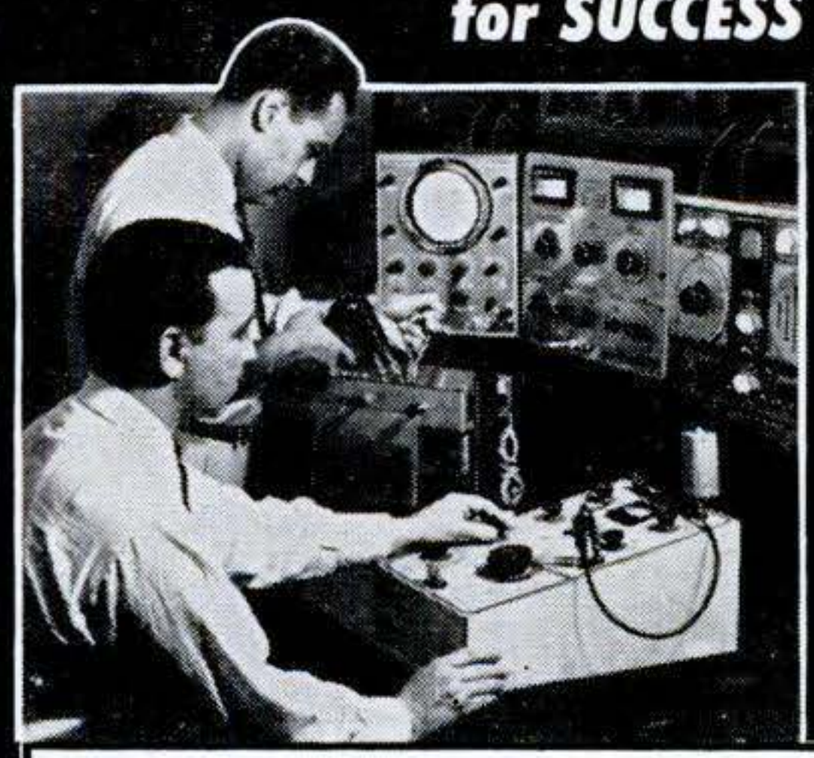
**CARL MILLER**
**REGISTERED PATENT ATTORNEY**
**WOOLWORTH BLDG., 35th FLOOR, 122C**
**NEW YORK CITY**



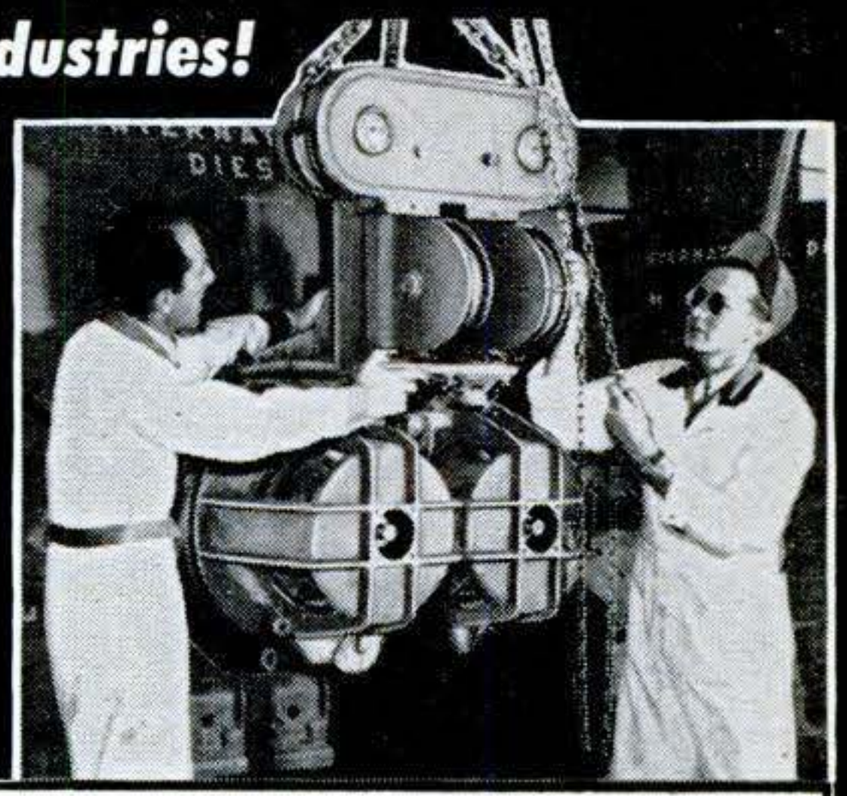
Copyrighted material

# GET SHOP-METHOD HOME TRAINING

***for SUCCESS in Today's Top Industries!***



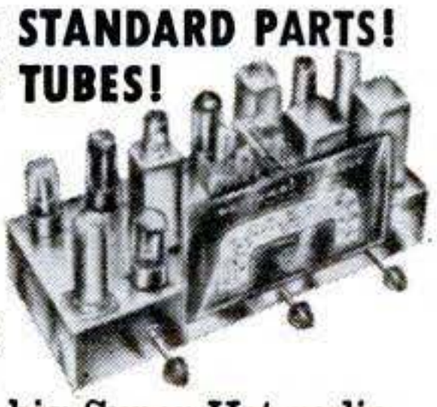
**SEND COUPON TODAY for FREE BOOK and COMPLETE SAMPLE LESSON!**



## RADIO-TELEVISION & ELECTRONICS OR AUTOMOTIVE-DIESEL & ALLIED MECHANICS

Like a business of your own . . . or a good job with a big firm . . . and get paid for what you know? Shop-Method Home Training in Radio, Television, Electronics will bring you the job...money...you've always wanted. 105 *million* Radios, 3100 stations...16 *million* TV sets, over 100 TV stations...many more, now Govt. restrictions are off. Defense industries want trained men for interesting, good pay jobs. Get into this opportunity-making industry...advance fast. Find out how...mail coupon...TODAY!

**I GIVE YOU STANDARD PARTS! INCLUDING TUBES!**



—they are yours to keep. You actually learn by doing, build generators, receivers, a big Super-Het radio.

**THIS PROFESSIONAL FACTORY-MADE MULTI-TESTER IS YOURS!**

Valuable equipment every Radio-TV man needs. Yours to keep!

**INVESTIGATE NOW!**

**LET NATIONAL SCHOOLS of Los Angeles, California, a Resident Trade School for almost 50 years, train you at home for today's unlimited opportunities. Pick your industry—mail coupon below now!**

### *EARN EXTRA MONEY* WHILE YOU LEARN!

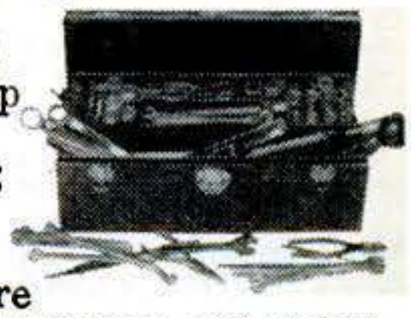
I show you how to earn extra money *while learning!* Many men have paid for their entire course in this way. You can, too. Remember: Shop-Method Home Training covers *every phase* of the industry — in an interesting step-by-step way. Why wait–take the first step to success—mail the coupon today!

**DRAFT AGE?** Training helps you get the service branch you want, advance fast.

That means higher pay and grade, more prestige — right away! Don't take a chance — mail coupon *now!*

Want to be your own boss . . . or get into booming industries? 8 *million* older cars need big, profitable services and repairs. Farm machinery is going Diesel. Defense industry begs for more and more trained mechanics for high-pay jobs. National Schools Shop-Method Home Training prepares you for all Automotive, Diesel, Allied Mechanics opportunities. Helps you get the security, good pay you've always wanted. Send coupon for your Free Book and Sample Lesson now!

**I GIVE YOU THE TOOLS OF YOUR TRADE!** Big professional-quality kit of tools of your trade — and all-metal tool box. All yours to keep —part of your course; they help make your training more practical — start you off right!

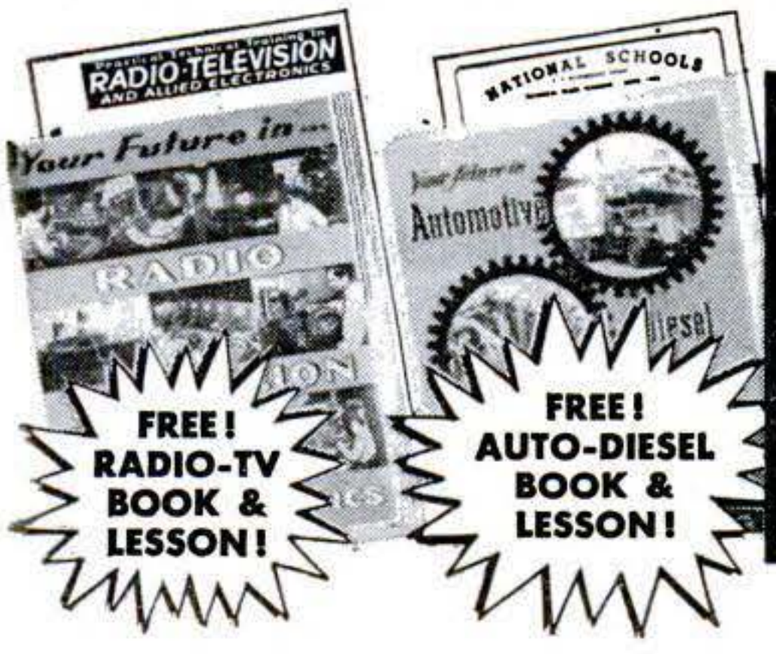


## NATIONAL SCHOOLS

**LOS ANGELES 37, CALIFORNIA**

*Established 1905*

**In Canada: 193 East Hastings Street Vancouver 4, B.C.**




**APPROVED FOR G.I. TRAINING**

***DON'T PUT IT OFF GET THE BIG SALARY YOU'VE ALWAYS WANTED!***

**MAIL TODAY—YOU'RE "ON YOUR WAY"!**

**NATIONAL SCHOOLS, Dept. C-122**
**4000 S. Figueroa Street**
**Los Angeles 37, California**

*Mail in envelope or paste on postal card*

I want to "get going"! Send me Free Book I checked and Free Sample Lesson. I understand no salesman will call.

☐ *My Future in Radio-Television & Electronics*
☐ *My Future in Automotive-Diesel & Allied Mechanics*

NAME_____ AGE_____

ADDRESS_____

CITY_____ ZONE_____ STATE_____

☐ **VETS! Check here if released from service less than 4 years ago.**



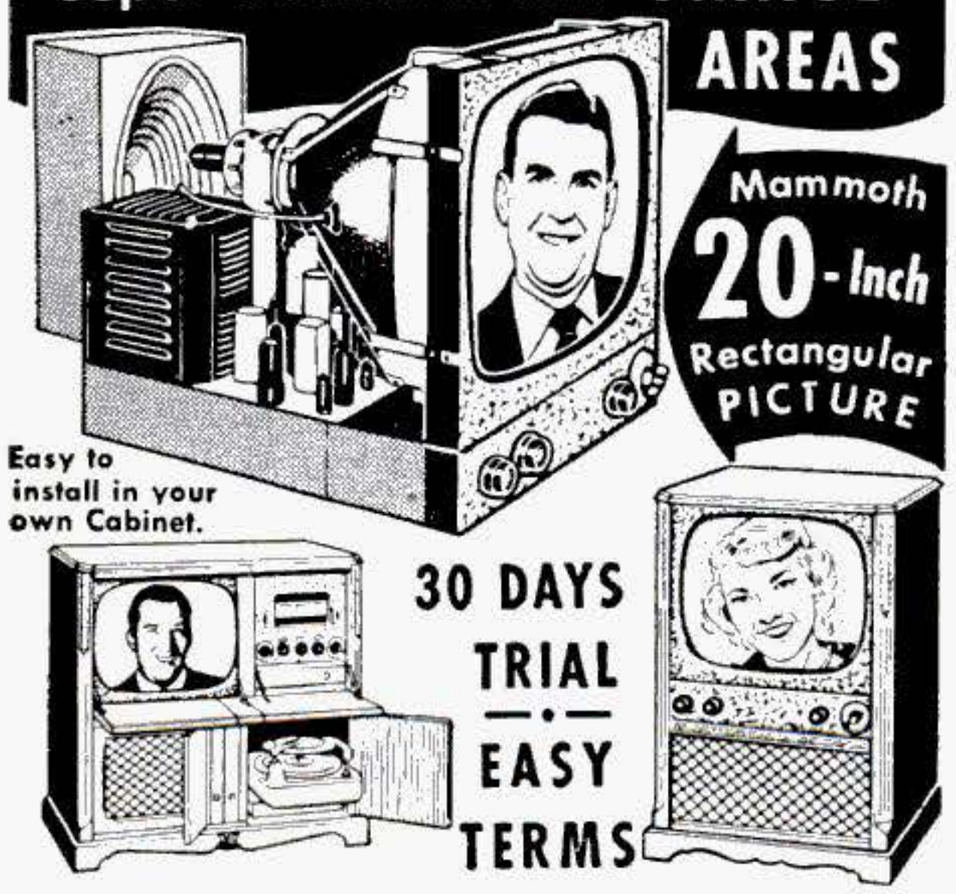
Copyrighted material

# NEW LOW PRICES

on these powerful NEW 1953

# MIDWEST TELEVISION

Super Powered for "FRINGE" AREAS




Midwest offers a sensational new 1953 line of beautiful consoles and complete chassis for easy installation in your own cabinet. Mammoth 20-Inch Television at low Factory Prices, and on 30 Days Trial.

**Buy DIRECT from the MIDWEST Factory and SAVE!**

SEND THIS COUPON For FREE MIDWEST 1953 Catalog

MIDWEST RADIO & TELEVISION CORP.
Dept. 24D, 909 Broadway, Cincinnati 2, Ohio
NAME _____
ADDRESS _____
CITY _____ ZONE ____ STATE _____



MONTH AFTER MONTH, YEAR AFTER YEAR, YOU SEE OUR AD.
CHECK AND DOUBLECHECK BEFORE YOU BUY ANYWHERE!

1 Are these tires "Family-Safe"? Our families use them.
2 Are They Recaps? Ours are not (except passenger Snow-Tires)
3 Will I get Goodyear, U.S. & famous Brands? From Us, You Must!
4 Is the guarantee unconditional? See our fine offers below.
5 Can good tires be bought cheaper? It's dangerous to pay less.
6 Is a tube included free? Yes, we do. See OUR Free Tube Offer.

GOODYEAR Firestone

GOODRICH, U.S. ROYAL, GENERAL & OTHERS, (NO NOT RECAPS)
DOUBLE WARRANTY & UNCONDITIONAL GUAR. ON PASS. TIRES

Our policy is to select your tires so carefully, as if our very future depended on the service given by that particular tire.

**FREE TUBE** WITH EVERY GOOD GRADE, AND FINEST GRADE PASSENGER AND TRUCK TIRE.

GOOD GRADE 20 MONTHS GUARANTEE BOND

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 600-16 | $4.02 | 820-15 | $5.30 | 600-20 | $6.92 | 32x6(8) | $8.50 |
| 650-16 | 4.40 | 700-15 | 4.22 | 650-20 | 7.52 | 32x6(10) | 9.80 |
| 700-16 | 5.00 | 670-15 | 4.40 | 700-20 | 8.40 | 900-20 | 13.10 |
| 650-15 | 4.00 | 710-15 | 4.60 | 750-20 | 8.40 | 1000-20 | 13.62 |
| 760-15 | 4.90 | 550-19 | 6.5[illegible] | 825-20 | 13.92 | 1100-20 | 13.94 |

FINEST GRADE, 30 MONTHS GOLDEN RULE GUARANTEE BOND
THIS GRADE MADE THE "BLATT" NAME WORLD FAMOUS

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 600-16 | $5.12 | 700-15 | $4.82 | 30 MONTH GUAR. TRUCK TIRES | | | |
| 600-16(6) | 5.92 | 475-19 | 5.08 | 600-15(6) | $9.92 | 700-20 | $13.52 |
| 650-16 | 5.92 | 640-15 | 5.02 | 700-17 | 10.62 | 750-20(8) | 12.92 |
| 650-16(6) | 6.92 | 670-15 | 5.22 | 750-16 | 9.62 | 750-20(10) | 17.52 |
| 700-16 | 6.52 | 710-15 | 5.72 | 750-15 | 13.22 | 825-20 | 18.22 |
| 700-16(6) | 8.72 | 760-15 | 5.92 | 750-17 | 11.52 | 900-20 | 17.22 |
| 750-16 | 7.02 | 800-15 | 6.62 | 700-18 | 15.82 | 1000-20 | 18.52 |
| 525-18 | 4.92 | 820-15 | 6.72 | 600-20 | 8.72 | 1100-20 | 18.52 |
| 550-17 | 4.52 | 760-16 | 6.62 | 650-20 | 10.22 | 1200-20 | 21.52 |
| 650-15 | 5.12 | 450-21 | 5.08 | 32x6(8) | 10.60 | 1000-22 | 17.52 |
| WHITEWALLS $1 EA. Extra | | | | 32x6(10) | 13.52 | 1100-22 | 20.42 |

Buy the 'Right' Truck Tires for "Your" Job

| Std. Guar. 20 Mos. | | Ruaged Guar. 32 Mos. Military Mud-Sno tread | |
|---|---|---|---|
| 750-20 std | $10.08 | 750-20 rugg | $14.52 |
| 750-16 std | $13.52 | 900-16 rugg | 15.08 |
| 750-16 rugg | 17.64 | 600-16 rugg | 9.95 |
| 900-16 std | 10.58 | | |
| 600-16 std | 6.48 | | |

Factory Retread Snow-Tires. 30-month Guarantee
"New Tire Traction" Goodyear, Firestone & Others

| | | | | |
|---|---|---|---|---|
| 670-15 | 600-16 | 710-15 | 650-15 | 650-16 |
| $8.50 | $8.50 | 760-15 | 700-15 | 800-15 $11 |

BLATT BLDG., GIRARD & LANCASTER AVES.
DEPT. PS, PHILADELPHIA 31, PA.
SEND CHECK OR MONEY ORDER & THIS AD.
Shipments RUSHED Down South, Far-West and Up North

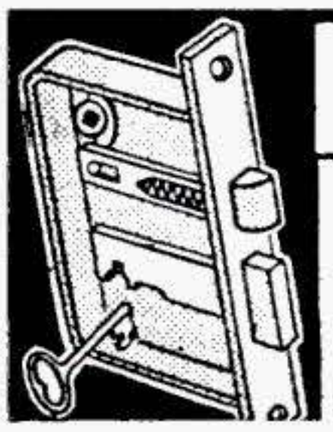
"How to MAKE MONEY with Simple CARTOONS"

A book everyone who likes to draw should have. It is free; no obligation. Simply address

FREE BOOK

CARTOONISTS' EXCHANGE
Dept. 1912-D Pleasant Hill, Ohio





# FIX LOCKS

Learn Locksmithing and Keymaking from Experts in Your Spare Time at Home!

Age or physical handicap no disadvantage. Year-round, steady income in this permanent, respected field. Full or part time. Practical, illustrated lessons show you how to make money even while learning! All materials and special tools supplied. Send for FREE BOOKLET.

LOCKSMITHING INSTITUTE, Dept. PS-36
15 Park Ave. Rutherford, N. J.
*Lic. by State of N. J.* *V.A Approved*



Famous 15 and 17 Jewel

# BULOVA WATCHES $16.95 PLUS TAX

PRACTICALLY WHOLESALE TO YOU

LIFETIME WRITTEN GUARANTEE

WERE UP TO $59.50 SAVE $42.55

Also Choice Of
- BENRUS
- GRUEN
- WALTHAM or
- ELGIN Watches

You get these unredeemed LIFETIME GUARANTEED Bulova and other movements in latest style Yellow Gold Cases at this sensationally low price because we bought out SURPLUS STOCKS of leading New York and Md. jewelers. Order now while they last. Specify make preferred and whether men's or ladies'. Only $16.95, plus $1.70 tax. Order right now.

Free Trial Offer! Wear At Our Risk!

*Money back guarantee in 10 days if not delighted!*

SEND ONLY $1 with order. Pay balance C.O.D. plus postage. Or we pay postage if you enclose $16.95 plus $1.70 tax.

**FREE!** Handsome Expansion band with orders.

Air Mail Xmas Delivery Guaranteed.

**Maryland Distributors, Dept. 421**
501 E. Baltimore St., Baltimore 2, Md.,
Write for Free Watch and Diamond Ring Catalog—Practically Wholesale Prices.

Lifetime Guaranteed 17 Jewel Swiss WRIST WATCH
Worn by Army, Navy & Marines
Originally $59
$14.95 Plus $1.50 Tax
New Incablock, Shock-Protected
WATER-DUST PROOF



# MEN! Do You Suffer FROM

**Pains in Lower Back, Hips and Legs; Low Vitality, Nervousness, Irritability, Night-Rising, Bladder Trouble, Forgetfulness, Sleeplessness; Weak, "Worn-Out" Feeling and a General Decline in Health? If so, then send for our Free "facts" booklet** containing much information of value to you. Booklet is mailed together with Questionnaire Blank in plain wrapper. **Don't Delay!** Send for your copy Now! NO OBLIGATION.

MAIL THIS COUPON

MILFORD SANITARIUM, Box PS
MILFORD, KANSAS

Gentlemen: Please send me your **Free "Facts"** Booklet and **Health Questionaire.**

NAME..... AGE.....
ADDRESS.....
CITY and STATE.....

# Now Any AUTO REPAIR JOB Can Be a "Push-Over" for You!

**Free 7-DAY OFFER!**

## IN LESS TIME—WITH LESS WORK—AND MORE PROFITS!

NOW, tackle anything from carburetor to rear end on ANY car built from 1935 thru 1952. And fix it quick, easy, right the FIRST time! Just look up make, model, and job in quick index of MOTOR's ***brand-new*** AUTO REPAIR MANUAL. Clear, illustrated instructions lead you step by step all the way. Covers all automatic and semi-automatic transmissions including the new Dual-Range Hydromatic, the new Power Steering.

### *ONLY Manual of Its Kind!*

The engineer-editors of MOTOR Magazine condensed all the meat of over 170 official factory manuals for you. They dug out all the information you need—made sure every word and picture is crystal clear—and put the whole "works" into this one big 780-page book.

Contains 225,000 service, repair, tune-up facts. 38,000 essential dimensions! More than 2400 cut-away photographs, diagrams, charts *show* what the clear text *tells*.

Used by U. S. Army and Navy

**COVERS 851 MODELS—ALL THESE MAKES**

| | |
|---|---|
| Buick | Henry J |
| Cadillac | Hudson |
| Chevrolet | Kaiser |
| Chrysler | Lafayette |
| Crosley | La Salle |
| De Soto | Lincoln |
| Dodge | Mercury |
| Ford | Nash |
| Frazer | Nash Rambler |
| | Oldsmobile |
| | Packard |
| | Plymouth |
| | Pontiac |
| | Studebaker |
| | Terraplane |
| | Willys |

### *Win Prestige! Earn More Money!*

MOTOR's Manual makes every operation so easy that you'll find yourself tackling jobs you wouldn't think of doing before. And you'll win added prestige and more money in the bargain.

Beginners will find usable helpful guidance on every kind of repair and service job imaginable. Experts will be amazed by the time and labor-saving short cuts.

This GIANT Manual is used by Army, Navy, Technical Schools, and thousands of successful auto-repairmen. Now YOU can try it FREE for 7 days. Learn first-hand how it can *pay for itself* the first few times you use it!

### *SEND NO MONEY*

Mail coupon below — *without money!* When your book arrives — *make it show you what it's got!* Unless you agree it's the greatest time and work saver you've ever seen—return book in 7 days and pay nothing. Mail coupon NOW! MOTOR Book Department, Desk 2P, 250 West 55th St., New York 19, N. Y.

### Just 2 of the Many Letters of Praise

"MOTOR's Manual paid for itself on the first 2 jobs, and saved me valuable time by eliminating guesswork." — W. SCHROP, Ohio

"Instructions so clear have no trouble learning anything about any car. Now working as mechanic in big plant." — SAM ORDONEZ, California

**Same FREE Offer on MOTOR's New TRUCK & TRACTOR MANUAL**

A "must" for mechanics, truck specialists, service stations, fleet owners. Covers EVERY job on 3100 truck and 160 farm tractor models made from 1936 thru 1952! Over 2200 pictures, 930 **pages, 300,000** facts. Used by Armed Forces.

All types of Gasoline Engines, Fuel Systems, Governors, Lubrication Systems, Starters, Generators, Clutches, Transmissions, Axles, Brakes, Steering, etc. For FREE 7-DAY TRIAL check box in coupon.

Published by MOTOR, The Leading Automotive Business Magazine.

**MAIL COUPON NOW FOR 7-DAY FREE TRIAL**

**MOTOR BOOK DEPT.**
**Desk 2P, 250 West 55th St., N. Y. 19, N. Y.**

*Rush to me at once (check box opposite book you want):*

☐ **MOTOR's New AUTO REPAIR MANUAL.** If O.K., I will remit $1 in 7 days (plus 35c delivery charges), $2 monthly for 2 months and a final payment of 95c one month after that. Otherwise I will return the book postpaid in 7 days. *(Foreign price, $8 cash with order.)*

☐ **MOTOR's New TRUCK & TRACTOR REPAIR MANUAL.** (Described at left.) If O.K., I will remit $2 in 7 days, and $2 monthly for 3 months, plus 35c delivery charges with final payment. Otherwise I will return book postpaid in 7 days. *(Foreign price, remit $10 cash with order.)*

Print Name... .....Age.....

Address .....

City .....State.....

☐ **Check box and save 35c delivery charge** by enclosing WITH coupon entire payment of $5.95 for Auto Repair Manual (or $8 for Truck & Tractor Repair Manual). Same 7-day return-refund privilege applies.



Copyrighted material

## I HELPED T.E.H. MAKE $14 A DAY WHILE STILL LEARNING!

**T. E. H.—West Virginia.** "By the time I finished half your course, I was making $14.00 per day. I have made enough on the side to more than pay for the course."

H. T. ARMSTRONG

# Learn ELECTRIC APPLIANCE REPAIR & SERVICE

**WE TEACH:**
How to Repair
Washing Machines
Vacuum Cleaners
Electric Ranges
Lamps, Motors,
Irons, etc.,
REFRIGERATION
and
House Wiring
At Home
In Your
Spare Time!

For a man handy with tools, and happiest when working with his hands, OPPORTUNITY is Wide Open Today in this great and growing field. Everyone is a customer for the man trained to service electric appliances.

## Open Your Own Shop

Our practical HOME COURSE teaches you this business from A to Z—preparing you to take a well paid job or open your own shop. You can actually start in your basement or garage with the tools we send you . . . before finishing.

We Include An ELECTRICAL APPLIANCE TESTER A Big Kit of Tools at NO EXTRA COST

**MAIL THIS COUPON for FREE BOOK**

**H. T. ARMSTRONG**
**PACIFIC TRAINING SCHOOLS**
**7217 So. Broadway, Dept. S-5212, Los Angeles 3, Calif.**
Dear Sirs: Please send me, without obligation, your free booklet and complete details.

Name_____

Address_____

City_____ Zone____ State_____

## "My selling time actually shows me a profit of $20 TO $25 AN HOUR"

### with Science's New Midget Miracle, the PRESTO Fire Extinguisher

M. R. STANLEY

**says M. R. Stanley of Montana. Many others "cleaning up"—so can YOU!**

THIS is an amazing **new kind** of fire extinguisher. Tiny "Presto" (about the size of a flashlight) does job of bulky extinguishers that cost 4 times as much, and are 8 times as heavy. Ends fires fast as 2 seconds. Fits in palm of hand. Never corrodes. **Guaranteed for 20 years!** Sells for only $3.98! Over a million already sold!

Show it to civil defense workers, owners of homes, cars, boats, farms, etc., and to stores for re-sale. Make good income. C. S. Melious made $175 in just first 5 days. C. Kama, $1,000 a month. Write for FREE Sales Kit. No obligation.

Science's New Midget Miracle—"PRESTO"

**MERLITE INDUSTRIES, Inc., Dept. 1112**
**201 East 16th St., New York 3, N. Y.**
(In Canada: Mopa Co., Ltd., 371 Dowd St., Montreal 1, P. Q.)

(If you want a regular Presto to use as a demonstrator, send $2.50. Money back if you wish.)

WHAT GOOD IS A TIRE WITHOUT A TUBE?

**TUBE GIVEN WITH EVERY TIRE AT NO EXTRA COST**

# Why Pay More!

**WINTER SPECIALS—AT LOW PRICES**
**SAVE TIME—SAVE MONEY—SEND THIS AD**

GOOD USED TIRES—NOT RECAPS
19 YEARS AT THIS ADDRESS
BE WISE—A TRIAL OF ONE
TIRE WILL CONVINCE YOU.

**VETS & SERVICEMEN MAY TAKE 10% off ON EVERY TIRE**

**20 MONTHS WRITTEN GUARANTEE**

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 600-16 | $4.10 | 820-15 | $5.35 | 600-20 | $7.10 | 32x6(8) | $8.55 |
| 650-16 | 5.55 | 700-15 | 4.50 | 650-20 | 7.85 | 32x6(10) | 9.85 |
| 700-16 | 5.00 | 670-15 | 4.45 | 700-20 | 8.45 | 900-20 | 13.15 |
| 650-15 | 4.35 | 710-15 | 4.65 | 750-20 | 8.55 | 1000-20 | 13.75 |
| 760-15 | 4.95 | 550-17 | 4.45 | 825-20 | 14.65 | 1100-20 | 13.85 |

**EXTRA SPECIAL 30 MONTH WRITTEN GUARANTEE**

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 600-16 | $5.35 | 475-19 | $4.85 | 700-15(6) | $8.95 | 700-20 | $11.00 |
| 600-16(6) | 6.45 | 640-15 | 5.05 | 750-16(8) | 10.75 | 750-20(10) | 15.45 |
| 650-16 | 5.85 | 670-15 | 5.55 | 700-17 | 9.95 | 750-20(8) | 15.05 |
| 650-16(6) | 7.35 | 710-15 | 5.75 | 750-17 | 11.75 | 825-20 | 18.35 |
| 700-16 | 6.45 | 760-15 | 6.05 | 750-15 | 13.95 | 900-20 | 17.25 |
| 750-16 | 9.25 | 800-15 | 6.55 | 825-15 | 12.95 | 1000-20 | 17.75 |
| 525-18 | 5.00 | 820-15 | 6.65 | 600-20 | 8.75 | 1100-20 | 19.55 |
| 550-17 | 4.95 | 670-16 | 6.35 | 650-20 | 10.25 | 1000-22 | 19.45 |
| 650-15 | 5.35 | 760-16 | 7.15 | 32x6(8) | 11.15 | 1100-22 | 20.45 |
| 700-15 | 5.45 | 700-16(6) | 7.65 | 32x6(10) | 11.75 | 1200-20 | 29.95 |

White Walls $1.00 Extra — Military treads 750-20 16.15

Thousands of tires shipped all over U. S. A. All tires shipped F.O.B. Phila. Send Check or M.O. with this ad. Dept. 5.

**STANDARD, 834 N. Broad St., Philadelphia 30, Pa.**

## BECOME AN EXPERT IN TRAFFIC

Traffic men earn $4,000 to $10,000 and up. Thousands of firms need experts on rates, tariffs, regulations. We train you thoroly in spare time at home for executive traffic jobs. Personal training under traffic authorities. Placement counsel and help. Write for free 48-page book "Traffic Management—the Fast Growing Profession."

**LASALLE Extension University, 417 So. Dearborn St.**
A Correspondence Institution, Dept. 1283T, Chicago 5, Ill.

## GET INTO ELECTRONICS

You can enter this uncrowded, interesting field. Defense expansion, new developments demand trained specialists. Study all phases radio & electronics theory and practice: TV; FM; broadcasting; servicing; aviation, marine, police radio. 18-month course. Graduates in demand by major companies. H. S. or equivalent required Begin Jan., March, June, Sept. Campus life. *Write for catalog.*

**VALPARAISO TECHNICAL INSTITUTE**
**DEPT. 503** **VALPARAISO, INDIANA**

## TASOPE PHOTO-ENGRAVING PLANTS

MATERIAL COST OF THIS CUT 3/4¢ SELLING PRICE $1.00 AND UP

Establish your own profitable PHOTO-ENGRAVING business. Make cuts for newspapers, printers, and advertisers. Make etched name plates, plaques etc. Instructions furnished, no experience necessary. Sold direct from factory since 1931. First five hundred cuts sold locally or by mail will pay for plant and pay you well for your time. Write for FREE catalog.

**TASOPE DEPT. PS-12, AURORA, MO.**

## BE A FROGMAN!

Join the new national FROGMAN CLUB today. All you have to do is send $1.00—be sure to include your name and address—and here's what you get:

1) A miniature pair of Frog Feet. Can be worn on key chain, lapel or hung on windshield as lucky charm.
2) An attractive membership card.
3) A Frogman decal to be used on your windshield, bicycle or notebook.
4) A booklet on "How To Swim Underwater" and "The Supreme Sport of Spearfishing."
5) Periodic bulletins on the latest developments in Frogman equipment and news.
6) Complete catalog of Frogman equipment available for purchase.
7) **A free coupon for $1.00,** which can be used toward the purchase of a pair of regular size Frog Feet, $6.95 or equivalent in value. This is redeemable at your local sporting goods dealer, drug store, auto supply store or toy departments. If no such dealer available in your area, we will handle direct.

*BE A FROGMAN — Send your dollar today!*

**National Frogman Club**
**1428 Maple Avenue, Dept. PS-12, Los Angeles 15, Calif.**



Copyrighted material

# Your car deserves a Christmas present, too!

# MARVEL *mystery oil*

When you change oil this winter, add a quart of Marvel Mystery Oil. You can't give your car a finer present — you can't give *yourself* a smoother ride, free of engine trouble. Marvel's low pour-point (65° below zero) insures easy starting on the coldest day, with longer battery life. Use Marvel in the crankcase, gas tank, or top cylinder oiler. It goes to work where regular oils stop — prevents hydraulic valve troubles . . . internal motor rust . . . carbon formation. Unlike many oil additives, Marvel Mystery Oil contains no harmful acids or graphites. Instead, it protects and adds to the life of your motor.

*See your dealer or write us for full information. EMEROL MANUFACTURING CO., INC., Dept. 112, 242 West 69th Street, New York 23, N. Y.*

## BE ENGINE WISE...MARVELIZE NOW!



Copyrighted material

# Learn to MOUNT Birds and Animals

## To All Men & Boys!

***Here is FUN and PROFIT!***

## Send Coupon for Free Book

Tells all about **Taxidermy,** and how *you* can learn **at home** to mount life-like **Birds, Animals, Game-Heads, Fish.** Save your valuable trophies. Decorate your home and den. Learn genuine **Chrome Tanning** for harness and sole leather buckskin and fine furs. Mount **Common** specimens, squirrels, rabbits, owls, even frogs, into marvelous craft-work groups, both useful, humorous. Wild game not necessary. Marvelous hobby. Fascinating.

**BIG PROFITS** Turn your spare time to cash. Have a sideline profitable business. Mount game trophies for sportsmen: sell your own mounts: save money and **Make Money** with expert tanning. Learn *by mail* from old reliable school with 400,000 graduates. **Investigate Now.** Send coupon or letter or post card **Right Now** for this marvelous **FREE BOOK.** There is no cost or obligation. Please state your **AGE.**

## FREE BOOK

**Northwestern School of Taxidermy,**
**2612 Elwood Bldg., Omaha, Neb.**

Gentlemen:—Please send me your FREE 48-page booklet explaining Taxidermy. (Please print plainly, and state **age.** Use postal card if more convenient.)

*Name* _____ *Age* _____

*Address* _____

---

# $1,000.00 Worth of Furniture for Cost of Materials Alone!

Make over $1,000 worth of furniture for indoors and out with help of amazing new book "WISE HOME FURNITURE BUILDER." Over 500 pictures, plans, and step-by-step instructions. No special tools or experience needed. **Save $10.00 to $200.00** on Tool Cabinets, Workbench, Portable Tool Box, Tennis Table, Built-In Wardrobe Closet, Storage Chest, Barbecue Pit, Garden Furniture **and much more!** 256 big double-column pages. Thousands paid $2.95 and $3.95. Now we SLASH price to only $1.95. Mail card for week's FREE-Trial **today.** Write Dept. 8012

**Wm. H. Wise & Co., Inc., 50 W. 47th St., N. Y. 36, N. Y.**

---

# Learn UPHOLSTERING

***FOR FULL OR SPARE TIME PROFIT***

**Easy to learn at home! Easy to start a shop, or earn spare-time profits! Complete tool set, all materials to build ottoman, included with lessons Low terms. Write for valuable booklet today!**

**COMMERCIAL TRADES INSTITUTE**
**1400 Greenleaf Ave., Dept. U1-12, Chicago 26, Ill.**

---

# Start Your OWN ELECTRICAL APPLIANCE REPAIR BUSINESS

Repair electrical appliances of friends and neighbors. Service electrical equipment in factories, stores, etc. Work full or part time! New Shop Method home-training system. Rush name today for **FREE BOOK** and special form for getting Electronic Kit, Valuable Heating Element Kits, Advisory Service and Illustrated Instructions on new easy-payment plan. Pay later from **EARNINGS WHILE LEARNING.** Rush name today.

**CHRISTY TRADES SCHOOL**
**4432 N. Kedzie, Dept. D-2201, Chicago 25**

---

***Illustrated***

# BOOKLETS

**HERE THEY ARE, illustrated comic booklets just off the press. Good clear illustrations. Send $1 for 12 booklets and receive FREE two of the larger size 32 page books. Rush a buck for all 14 books to,**

**AL'S PRINT SHOP**
**216-D W. JACKSON BLVD. CHICAGO, ILL.**

---

# *FREE* CRAFT CATALOG

**120 PAGES...** Craft Supplies, Tools, Designs, Instruction Books from America's Largest, Most Complete Handcraft Stock.

***Send for your free copy NOW!***

**GRIFFIN CRAFT SUPPLIES**
**5626-B Telegraph Ave. • Oakland 9, Calif.**

---

# HE-MAN VOICE!

STRENGTHEN *your* voice this tested *scientific* way. Yes—you may now be able to improve the POWER of your speaking and singing voice . . . in the privacy of your own room! Self-training lessons, mostly silent. No music required.

**FREE BOOK** Write TODAY for Eugene Feuchtinger's great booklet "How to Develop a Successful Voice." It's absolutely FREE! You must state your age. Booklet mailed postpaid in plain wrapper. No salesman will call. Send your name and age RIGHT NOW!

**PREFECT VOICE INSTITUTE**
**210 S. Clinton St. Studio MY-1 Chicago 6, Ill.**

---

# Give ME 15 MINUTES A DAY To Prove I Can make YOU a *NEW MAN!*

That's all I want—**just 15 minutes a day** to prove I can give you a powerful body of might and muscle—with my quick **"Dynamic-Tension"** method.

Mail coupon below—and I'll send you, **absolutely free,** my new book, "Everlasting Health and Strength." Reveals secrets that changed me from a 97-pound weakling to winner of title, "World's Most Perfectly-Developed Man." Shows how I can build you a champion body the same easy way!

I've taken thousands of flabby, no-muscle men and given them big, powerful muscles, increased measurements, amazing strength, vitality, pep. My natural **"Dynamic-Tension"** method develops real men—tones up the entire body, inside and out!

Send NOW for free copy of my book filled with pictures and body facts. Find out how I can make **you** the husky, big-muscled NEW MAN you **can** be! Mail coupon TODAY.

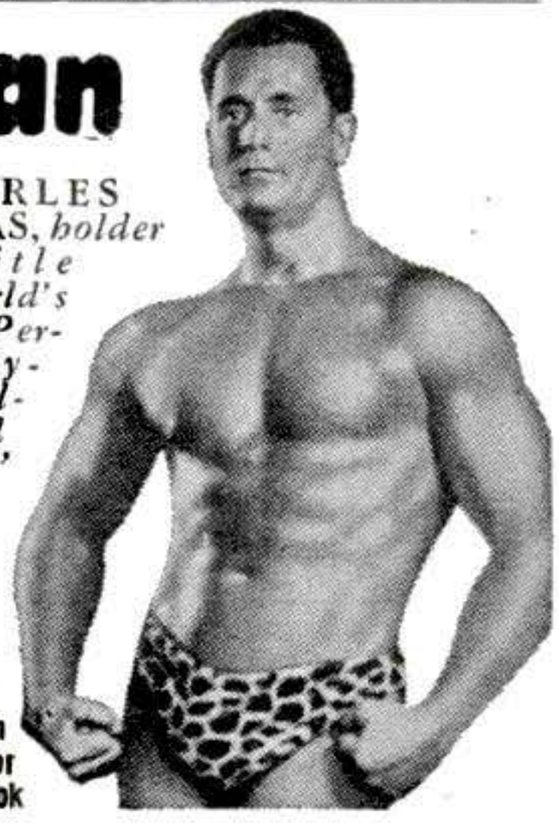
**CHARLES ATLAS, Dept. 1Z,**
**115 East 23rd Street, New York, N. Y.**

Send me your Free Book which proves how **"Dynamic Tension"** can make me a NEW MAN.

Name ..... Age .....

Address .....

City ..... State .....



CHARLES ATLAS, *holder of title "World's Most Perfectly-Developed Man."*

**Mail Coupon Now For Free Book**



Copyrighted material

AMAZING NEW TRAINING PLAN

Leonard C. Lane,
B.S., M.A.
President of Radio-Television Training Association,
Exec. Dir. of Pierce School of Radio and Television

# NOW ... YOU CAN BECOME A LICENSED* TV TECHNICIAN

## LICENSED TV MEN MAKE MORE MONEY

**AT NO EXTRA COST! YOU GET A ROUND TRIP TO NEW YORK CITY**

FROM ANYWHERE IN THE U.S. OR CANADA—I pay your way to New York and return, PLUS 2 FREE weeks, 50 hours of advanced instruction and shop training at the PIERCE SCHOOL OF RADIO & TELEVISION. You use modern electronics equipment, including student-operated TV and Radio stations. You go behind the scenes of New York's big Radio-TV centers, to study first hand. And I give you all this AT NO EXTRA COST! (Applies to complete Radio-TV course only.)

Only RTTA makes this amazing offer.

**SET-UP YOUR OWN HOME LABORATORY WITH THE 15 BIG TELEVISION-RADIO KITS WE SEND YOU (At No Extra Cost)**

**YOU BUILD AND KEEP ALL THESE UNITS**

—INCLUDING BIG SCREEN TV RECEIVER, plus Super-Het Radio Receiver, R.F. Signal Generator, Combination Voltmeter-Ammeter-Ohmmeter, C-W Telephone Receiver, AC-DC Power Supply. Everything Furnished Including All Tubes.

**EXTRA FEATURES THAT MEAN MORE MONEY FOR YOU!**

Thousands of new job opportunities will be available for you right in your own state, now that the government has lifted restrictions on new TV stations. My simple, successful methods can PREPARE YOU NOW to take your place in America's booming TELEVISION and Electronics industries . . . help you get the success and happiness that you always wanted out of life. You learn the practical, easy way by using actual parts and equipment in the 15 big Radio-TV kits I send you, including a COMPLETE TV RECEIVER . . . yours to build and keep.

**My Advanced Training Prepares You For Better Jobs**

Then, after you finish your training for a position as a full-fledged TV Technician—where you can write your own ticket and choose from dozens of fascinating careers—*I don't stop there!* I continue to train you—AT NO EXTRA COST—to qualify for even *better pay* in the BETTER JOBS that demand FCC licenses, with my . . .

**FREE* FCC COACHING COURSE**

- PREPARES YOU AT HOME FOR YOUR FCC LICENSE
- THE BEST JOBS IN TV AND RADIO REQUIRE AN FCC LICENSE

Given to every student at NO EXTRA COST after TV Theory and Practice is completed.

**NOW! Advanced FM-TV Training For Men Who Know Radio**

Prepares You For Higher Pay Jobs In A Few Months

COMPLETE theory and practical training course . . . complete with kits including large screen TV receiver.

FCC License Coaching Course Included FREE.

**Earn Extra Money in Spare Time**

Make as much as $25.00 a week in your spare time *while learning*—repairing Radio-TV sets. Many of my students pay for their entire training from spare time earnings almost from the very beginning . . . start their own service business.

FREE EMPLOYMENT ASSISTANCE. My vocational adviser will show you how you can have a good-paying career in the locality of your choice.

**VETERANS!**

MAIL COUPON TODAY

MY SIMPLE METHODS MAKE SUCCESS EASY!

THIS SCHOOL FULLY APPROVED TO TRAIN VETERANS UNDER *NEW* G. I. BILL! If discharged after June 27, 1950—CHECK COUPON BELOW!

**I GET MY GRADUATES GOOD PAYING JOBS**

"As Merchant Ship Radio Officer, I receive $867. for 40-day trip. Your training helped me get this fine position."
— Stanley Nawrocki

I now hold a fine airlines position at La-Guardia Field, New York City, thanks to your excellent training."
— Joseph Rosenberg

"Your excellent instruction helped me get my present job as an airport radio mechanic for American Airlines."
—Eugene E. Basko

"Thanks to your training, I qualified for a good job as a Receiver Tester at Federal Telephone and Radio."
—Paul Frank Seier

Many others working at NBC, RCA, CBS, Dumont, Philco, Emerson, Admiral and other leading firms.

**RADIO-TELEVISION TRAINING ASSOCIATION**

1629 Broadway, Radio City Station, New York City 19, N. Y.

Approved as a Correspondence School under the laws of the State of New York

BOTH FREE New Illustrated Book plus Sample Lesson

**NO SALESMAN WILL CALL!**

Mr. Leonard C. Lane, President
RADIO-TELEVISION TRAINING ASSN.
1629 Broadway, Radio City Station
New York 19, N. Y. Dept. P-12

Dear Mr. Lane:

Mail me your *NEW* FREE BOOK and SAMPLE LESSON that will show me how I can make BIG MONEY in TELEVISION. I understand I am under no obligation and no salesman will call.

Name _____ Age _____

Address _____

City _____ Zone _____ State _____

I am interested in: ☐ Radio-TV ☐ Advanced FM-TV

*VETERANS*: If qualified under new G.I. Bill, check here ☐

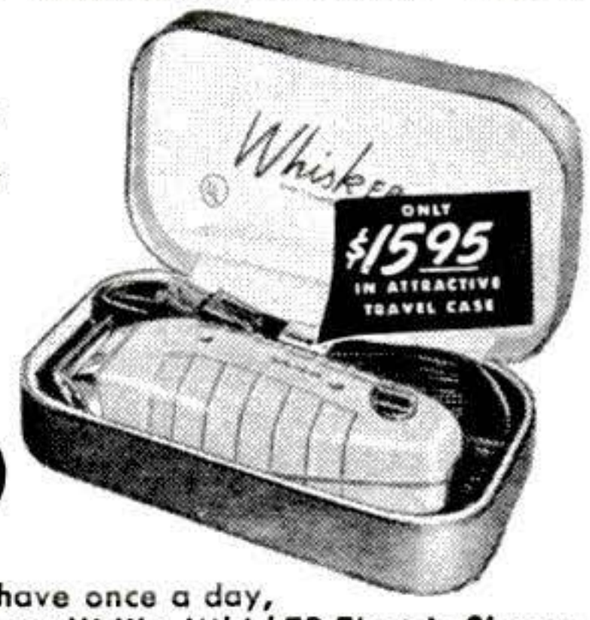


Copyrighted material

## THE CHRISTMAS GIFT HE WILL ENJOY EVERY MORNING!

**WHISK AWAY EVEN A 7 DAY BEARD WITH THE WHISKER ELECTRIC SHAVER**

Precision-built, with .002" thin blade that shaves all beards smoothly, closely.




Whether you shave once a day, or once a week you'll like WhiskER Electric Shaver. Its clipper-like blade is designed for all beards, is definitely less irritating. 110v AC model; no TV or radio interference. See your barber or dealer. If he cannot supply you, send $15.95—we pay postage; or send $2, you pay balance plus postage and COD. 10-day money-back guarantee.

**CADET ELECTRIC HAIR CLIPPER**
Cuts hair, removes superfluous hair from legs and under arms. The same fine quality clipper used and sold in many beauty shops. See your shop, or dealer. If you prefer, send $10.95—we pay postage; or $2, you pay postman balance, postage and C.O.D.

**ELECTRO TOOL CORP. Dept. W532-M, Racine, Wis.**

---

**ONLY ONE SALE CAN PAY YOU UP TO**

# $16.50 A DAY

**Showing Car Owners America's Greatest Auto Seat Cover Values Including**

# BAMBOO

**NEWEST SEAT COVER SENSATION**

## BIG MONEY FULL OR SPARE TIME

Want extra money—plenty of it day after day? Then rush your name and address at once for Free Sample Outfit that will start you taking orders from car owners everywhere for Key expertly tailored Auto Seat Covers. EXCLUSIVE NEW PATTERNS to fit every make and model car. No one can compete with you, in wide choice, in quality—and in expert tailoring that makes covers fit like a pair of gloves—and when you quote prices that are only a fraction of what the customer expects to pay, brother! You make money hand over fist writing up the fast orders! Line includes nationally advertised sensations like BLACK EBONY Saran, beautiful BAMBOO, brilliant FIESTA, colorful BULL FIGHTER PLAIDS, plus many other exclusive patterns to choose from, all at unbelievably low prices.

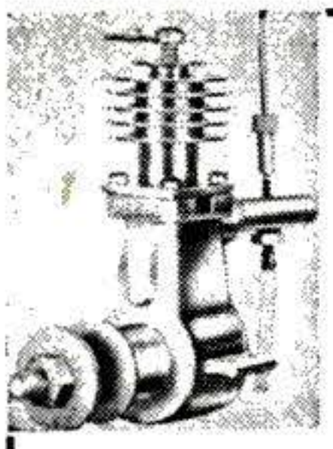
## Rush Name for FREE Outfit

**Give MAKE, YEAR and MODEL OF YOUR CAR**

No experience needed. Make all the extra money you need easily just by showing! Every car owner a "hot" prospect. YEAR AROUND STEADY PROFITS. No investment to make. Actual seat covers given to producers for OWN USE! Write for Free Selling Kit valued at $2.00 and actual samples TODAY!

**KEY PRODUCTS CORP., Dept. 612**
**800 N. Clark St., Chicago 10, Illinois**

---



**Our 570th Advertisement**

## REAL DIESEL ENGINE

**$3.95**
- for planes, boats, midget cars
- 7500 RPM; 1/7 HP; ht. 3½"; wt. 5 oz.
- precision machined for smooth operation

You just can't beat this price for a precision diesel engine! Streamlined, compact, easy to install. Thousands of satisfied users all over the world. Fast delivery if you ORDER TODAY! Send $3.95 plus 25c postage.

Engine is completely assembled, and includes all engine parts including; crankcase, crankshaft, connecting rod, piston, cylinder and carburetor.

**ORDER TODAY! FAST DELIVERY!**

**GOTHAM HOBBY CORP.**
**Dept. S, 107 E. 126th St., New York 35, N. Y.**

---

## FORCED AIR

INSTALL IT YOURSELF AND SAVE UP TO $200
CONVERT YOUR GRAVITY FURNACE TO MODERN QUICK FORCED AIR HEAT INSTALL McLARTY FANS IN YOUR COLD AIR PIPES. NO SHEET METAL WORK REQUIRED. SIMPLE ELECTRIC CONNECTIONS. LOWEST COST SYSTEM TODAY

McLARTY SYSTEMS 2608 DICKMAN RD.
BATTLE CREEK, MICHIGAN
In Canada Write
WINNIPEG SUPPLY & FUEL
WINNIPEG, MANITOBA

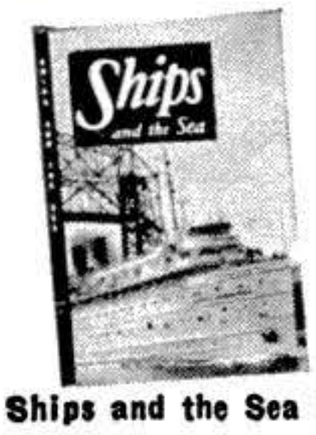
FREE CIRCULAR

---

**MEN PAST 40**

Men afflicted with Bladder Trouble, Getting Up Nights, Pains in Back, Hips, Legs, Nervousness, Dizziness, Physical Inability and General Impotency send for our amazing **FREE BOOK** that tells how you may correct these conditions and have new health and Zest in Life. Write today. No Obligation.
**Excelsior Institute, Dept. B-5, Excelsior Springs, Mo.**

---




## Ships & the Sea Magazine

You'll enjoy this big popular magazine. It's packed with sea-going pictures, salty yarns, charts, articles & model ship department. 50c at larger stands. **Special Offer!** Send $1 for 3-month trial. Act now!

**Ships and the Sea Magazine Dept. 1672 B, Milwaukee 3, Wis.**

---

## High School at Home

### Many Finish in 2 Years

No classes. No time wasted going to and from school. Progress as fast as your time and abilities permit. Standard H. S. texts supplied. Thousands enroll each year in this 55-year-old school. Send for FREE descriptive booklet.

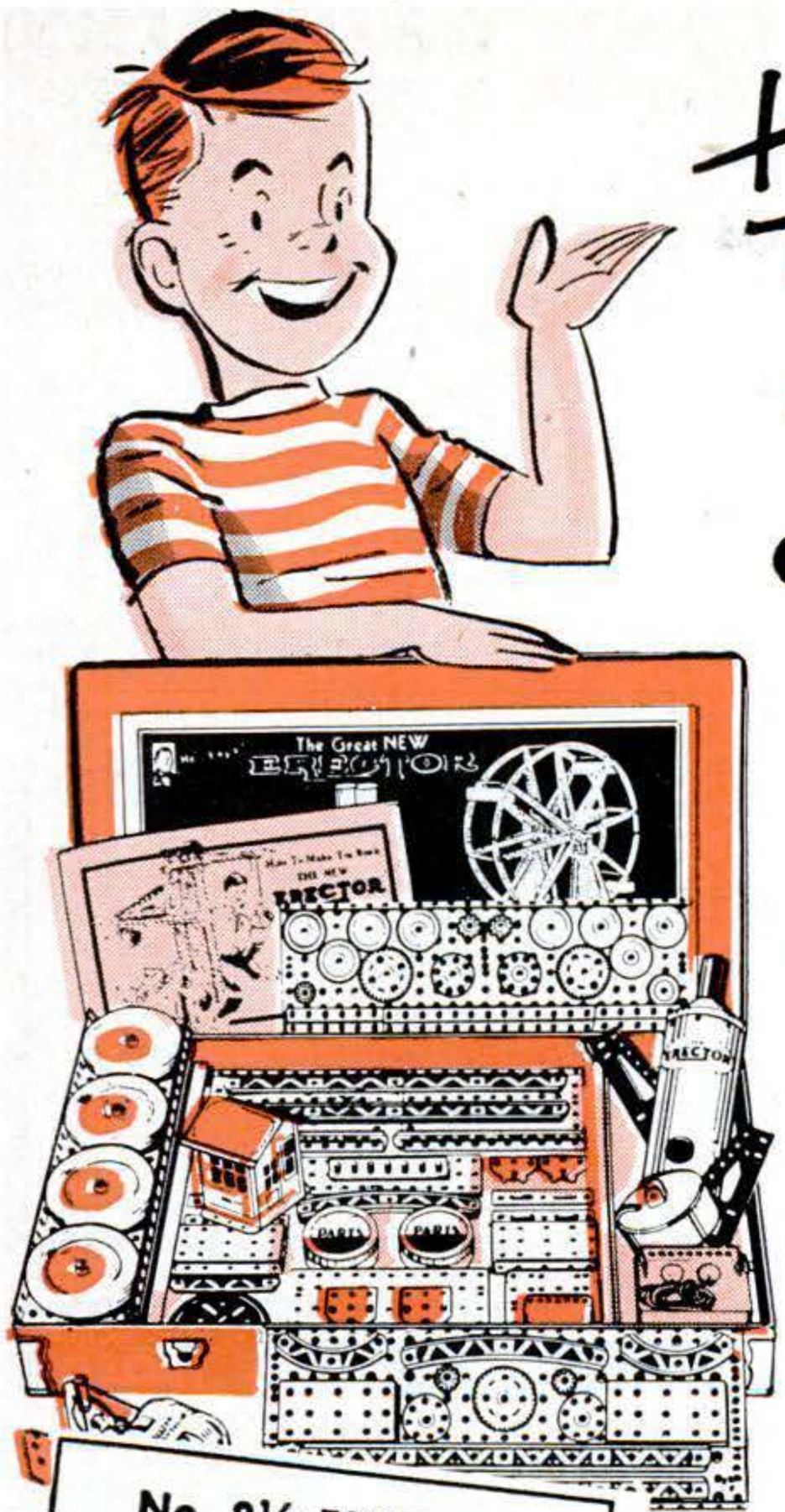
**AMERICAN SCHOOL, Dept. H946**
**Drexel at 58th St., Chicago 37, Ill.**
Without obligation, please send FREE descriptive booklet.

Name.....

Address.....



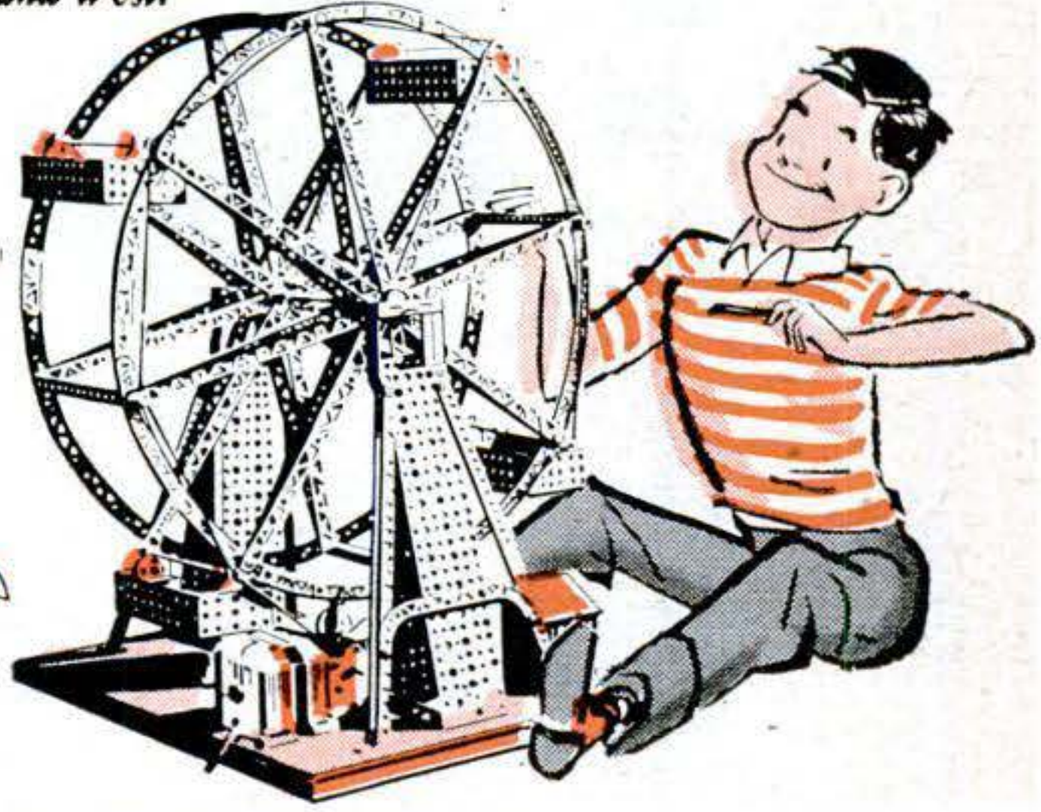
Copyrighted material




# *Hey, Gang!* Get an ERECTOR® and you have your own TOY FACTORY!

Open your new Erector Set and feast your eyes on the dazzling array of precision-made parts! What thrilling times you'll have building dozens of gigantic engineering marvels! There's more excitement when you turn the switch of Erector's powerful electric engine and your models come alive. Only an Erector Set makes possible models that blaze with lights—whistle—puff smoke—go choo-choo-choo—operate by remote control. Christmas is just ahead—so show this ad to Dad. Erector prices start at $2.00./ *$2.10 Denver and West.*

**No. 8½ ERECTOR**
All Electric Set. Over 15 POUNDS of parts—including electric engine with 4 speeds — lights — electro-magnet — Flex-O-Matic coupler. Makes over 100 action models. Price $23.50. $24.50 Denver and West.

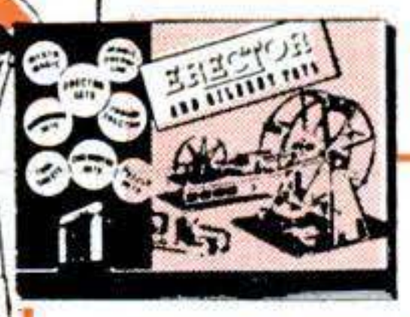


**GIANT FERRIS WHEEL.** Turns in either direction—fast or slow. Make it with No. 8½ Erector.

*World's Greatest Construction Set!*

**Famous true-to-life SQUARE GIRDERS—** won't bend, twist or wobble. Exclusive with Erector!

**THRILLING PARACHUTE JUMP**
Towers 5 feet high. Chutes float down automatically when they strike top. Make it with No. 10½ Erector.



**FREE** Exciting full-color Erector Toy Book

**GILBERT HALL OF SCIENCE**
**335 Erector Square, New Haven 6, Conn.**

FREE big, exciting Erector Toy Book. Contains dozens of color pictures and descriptions of all the new spectacular ERECTOR sets, PLUS eight other Gilbert wonder toys.

NAME .....

STREET .....

CITY ..... ZONE .... STATE .....



Copyrighted material

# Learn this Profitable Profession

## IN 90 DAYS AT HOME

## Money-Making Career Open to Men and Women, 18 to 60

Hundreds of men and women between 18 and 60 make $10 to $20 in a single day giving scientific Swedish Massage and Hydro-Therapy treatments. There is big demand from doctors, hospitals, sanatoriums and clubs. Graduates earn large full time incomes from these or in private practice in their own offices. Others make good money from home treatments given in spare time. Learn this interesting, money making profession in your own home, through our home study course. Same instructors as in our **nationally known** resident school. **You** can win independence and prepare for future security by qualifying for your Graduation Certificate. Course can be completed in 3 to 4 months. Many earn while they learn. Begin **your** training at once.

### NEW 32-PAGE BOOKLET *FREE*

Fill in the coupon below (please print name and address) and mail it for your FREE copy of 32-page Information Booklet. If you act at once we will include Anatomy Charts and Success Booklet which supply additional information you should have. All will be sent postage paid.

**THE COLLEGE OF SWEDISH MASSAGE**
**Dept. 270R, 41 E. Pearson St., Chicago 11, Illinois**

Please send me FREE and postpaid New 32-Page Illustrated Booklet, Anatomy Charts and Success Booklet at once.

Name.....Age.....

Address.....

City.....State.....

# FIND OUT *FREE!*

## HAVE YOU GOT WHAT IT TAKES?

**...to become a CRIMINAL INVESTIGATOR FINGER PRINT EXPERT?**

***FREE BOOKLET OFFER***

Everything to gain...nothing to lose. The famous, fascinating BLUE BOOK OF CRIME will give you examples of "what it takes" to track down outlaws and thieves. Read this exciting story of the triumph and battle of law and order against crime. THEN, decide for yourself if YOU have what it takes for exciting, steady, "good pay" work. OUR GRADUATES ARE KEY MEN in more than 800 Identification Bureaus.

Institute of Applied Science has been teaching finger print and firearms identification, police photography and criminal investigation for more than 30 years. No obligation. No salesman will call.

***GET THE FACTS . . . FREE! Mail Coupon Today!***

**INSTITUTE OF APPLIED SCIENCE, Dept. 1369**
**1920 Sunnyside Ave., Chicago 40, Ill.**
*(A Correspondence School Since 1916)*

Gentlemen: Without obligation or expense to me, send me the famous "Blue Book of Crime" absolutely free.

Name_____

Address_____RFD or Zone_____

City_____State_____Age_____
You must state your age.

# SENSATIONAL OPTICAL BARGAINS

### IMPORTED 20X TELESCOPE AND TRIPOD

Machined threaded fittings throughout. Weighs 7 ounces. 6¾" closed length. 13½" open length. Achromatic objective lens low reflection coated on inside. Makes excellent spotting scope. Swivel-head tripod is collapsible. 9" high.

**Stock #50,007-N** (with Tripod)...**$12.95 Pstpd.**
**Stock #50,006-N** (without Tripod) **$ 8.95 Pstpd.**

**SLIDE PROJECTOR SETS** Consists of all unmounted lenses you need to make the following size projectors:

**Stock #4029-N**—35 mm. .....**$2.85 Postpaid**
**Stock #4038-N**—2¼"x2¼" .....**$3.35 Postpaid**
**Stock #4039-N**—2½"x3½" .....**$3.35 Postpaid**

**SIMPLE LENS KITS**—Include plainly written, illustrated booklet showing how you can build lots of optical items. Use these lenses in photography and for dozens of other uses in experimental optics, building TELESCOPES, low power Microscopes, etc. Microscopes, etc.

**Stock #2-N—10 lenses**.....**$ 1.00 postpaid**
**Stock #5-N—45 lenses**.....**5.00 postpaid**
**Stock #10-N—80 lenses**.....**10.00 postpaid**

**Order By Stock No. Send check or M.O.**

We Have Literally Millions of War Surplus Lenses and Prisms for Sale at Bargain Prices, Numerous Types of Instruments. Too! Write for FREE CATALOG-N

**EDMUND SCIENTIFIC CORP., Barrington, N. J.**

# Wheels Wheels

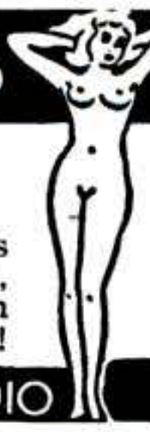
# Wheels Wheels

**5" Disc Wheel 5/8" Tire 5/16" or 3/8" sleeve.....30c ea.**
**6" Disc Wheel 5/8" Tire 5/16" or 3/8" sleeve.....35c ea.**
**7" Disc Wheel 3/4" Tire 3/8" sleeve.....45c ea.**
**8" Disc Wheel 1 1/8" Tire 1/2" sleeve.....70c ea.**
**7" Disc Wheel 1" Tire 1/2" ball bearing.....80c ea.**
**8" Disc Wheel 1 1/8" Tire 1/2" ball bearing.....$1.00 ea.**
**8" Disc Wheel 2" semi-pneum. T. 1/2" B.B.....$1.35 ea.**
**10" Disc Wheel 1.75 semi-pneum. T. 1/2" B.B.....$1.50 ea.**
**12" Disc Wheel 1.75 semi-pneum. T. 1/2" B.B.....$1.85 ea.**

Above wheel prices includes hub cap. Plus Postage. C.O.D.'s accepted.
**AXLES**—Sizes 5/16 in., 3/8 in., 1/2 in.—Cut to size—End holes drilled.

**UNITED WHEEL STAMPING CO.**
**12131 S. PEORIA STREET PS-12 CHICAGO 43, ILLINOIS**

# PROFITS MAKE YOUR OWN RUBBER MOLDS



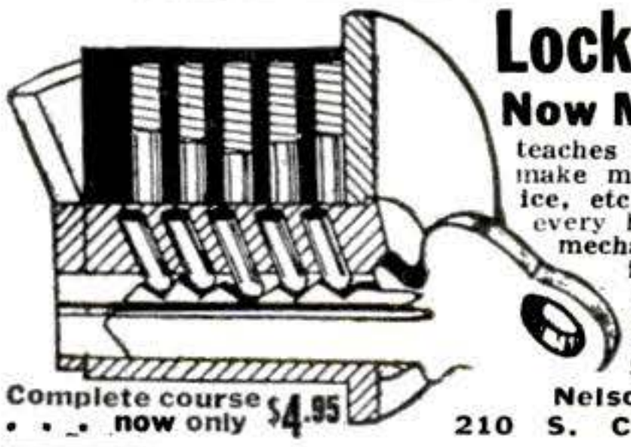
**WRITE TODAY FOR NEW FREE CATALOG**

Learn to cast thousands of perfect figurines, plaques, book ends, ash trays, etc. Start TODAY!

**NO EXPERIENCE GREAT PROFITS**

X. L. Rubber Pts. **$2.50** Qts. **$4.00** (postage extra) Models and enough for 3 molds **$1.50** prepaid.

PLASTIC ARTS STUDIO
3403 S. MADISON ST. DEPT. 3, MUNCIE, INDIANA



# Locksmithing AND KEY MAKING

**Now Made Easy!** Practical up-to-date course teaches you how to pick locks, de-code, make master keys, repair, install, service, etc. New self-instruction lesson for every handyman, homeowner, carpenter, mechanic, service station operator, fix-it shop, hardware dealer, gunsmith. 53 easy illustrated lessons. Full price only $4.95, postpaid; or C.O.D. plus postage. Satisfaction or refund guaranteed.

Complete course . . . now only $4.95

**Nelson-Hall Co., Dept. MY-1**
**210 S. Clinton St., Chicago 6, Ill.**

# Kidney Slow-Down May Bring Restless Nights

When kidney function slows down, many folks complain of nagging backache, headaches, dizziness and loss of pep and energy. Don't suffer restless nights with these discomforts if reduced kidney function is getting you down—due to such common causes as stress and strain, over-exertion or exposure to cold. Minor bladder irritations due to cold or wrong diet may cause getting up nights or frequent passages.

Don't neglect your kidneys if these conditions bother you. Try Doan's Pills—a mild diuretic. Used successfully by millions for over 50 years. It's amazing how many times Doan's give happy relief from these discomforts—help the 15 miles of kidney tubes and filters flush out waste. Get Doan's Pills today!



Copyrighted material

# Become an ELECTRICAL or MECHANICAL ENGINEER IN 36 MONTHS

★ Bachelor of Science Degree
★ Engineering Associate Certificate, 12-18 Months
★ Service Preparatory Courses, 3-12 Months

The growing shortage of trained engineers and technicians offers greater opportunity for ambitious young men. By 1955 there will be *at least* two positions for every graduate. Enroll *NOW* and earn your B. S. Degree in 36 months. Each of three levels of study is complete in itself. Technician courses can also be applied as *one-third* of the degree program. Faculty of specialists. Military, practical or academic training evaluated for advanced credit. Terms open JANUARY, APRIL, JULY, OCTOBER.

## CHOOSE FROM THESE 15 PROGRAMS

- General Preparatory Course — 3 Months

**SERVICE LEVEL — 6 to 12 Months**

- Electrical Service
- Refrigerator Service
- Welding Operator
- Heating Service
- Radio-Television Servicing Course

**TECHNICIAN LEVEL — 12 to 18 Months**

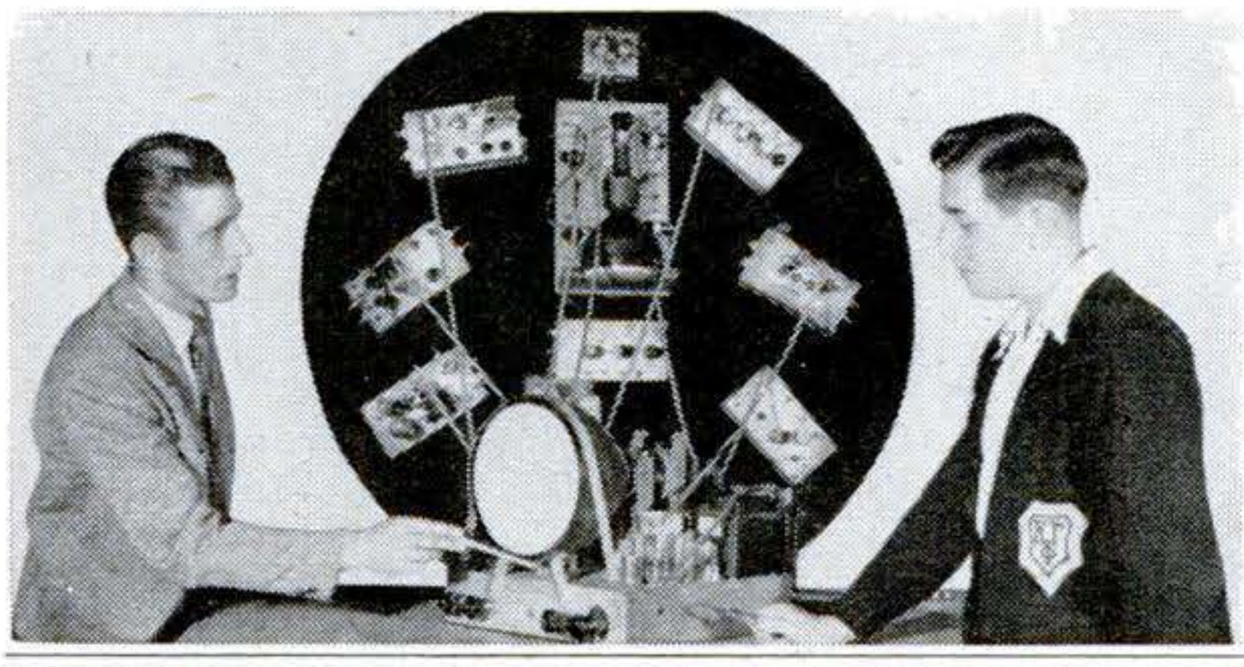
- Radio and Television
- Electronics
- Electrotechnics
- Air Conditioning
- Welding
- Mechanical

**ENGINEERING LEVEL — 36 Months — B. S. Degree**

Choice of functional electives: Production Sales or Research. • ELECTRICAL ENGINEERING — ELECTRONICS OR POWER MAJORS. • MECHANICAL ENGINEERING.

## MILWAUKEE SCHOOL OF ENGINEERING

NONPROFIT • FOUNDED IN 1903



Milwaukee School of Engineering
Dept. PS-1252, 1025 N. Milwaukee
Milwaukee 1, Wisconsin

Without obligation, send catalog and information on.....
(Name of Course)

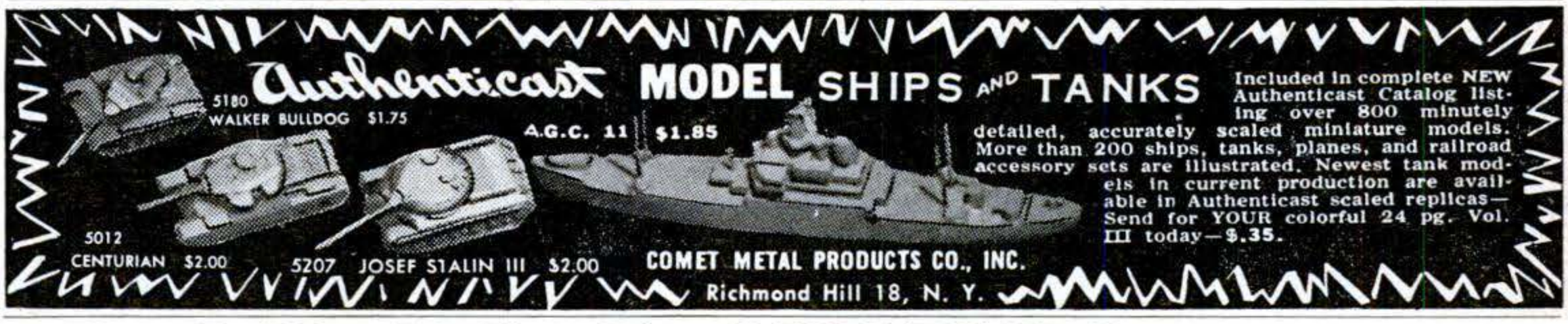
Name.....Age.....

Address.....

City.....Zone.....State.....

If veteran, indicate date of discharge

.....




Included in complete NEW Authenticast Catalog listing over 800 minutely detailed, accurately scaled miniature models. More than 200 ships, tanks, planes, and railroad accessory sets are illustrated. Newest tank models in current production are available in Authenticast scaled replicas—Send for YOUR colorful 24 pg. Vol. III today—$.35.

# LEARN MEAT CUTTING AT NATIONAL

**Pay After Graduation**

The steady dependable trade of Meat Cutting taught easily in 8 short weeks. You LEARN BY DOING under actual meat market conditions in big modern school at Toledo.

For beginners or men with experience. Get a profitable store of your own. Remember, PEOPLE MUST EAT! Big pay jobs. Free employment help. Thousands of successful graduates.

Buying, cutting, percentage, pricing, advertising, selling, etc. A complete retail meat education. National School established over 25 years. Get National training NOW. Pay your tuition in easy weekly payments after you graduate. Get all the facts. Send coupon for FREE 52 page school catalog—TODAY. G.I. Approved.

**National School of Meat Cutting, Inc.**
**Dept. 51-M, Toledo 4, Ohio**

Send me your FREE school catalog on National Training at Toledo in Meat Cutting. Meat Merchandising and Self Service Meats. No obligation. No salesman will call.

Name.....Age.....

Address.....

City.....State.....

**Approved for training Korean Veterans**



Copyrighted material

# EAVESDROP...

## behind the "IRON CURTAIN"!

*hear Aircraft! Ships! Amateurs!*

*Sensational*

**TABLE RADIO**
**SW-54**
**$49.95**

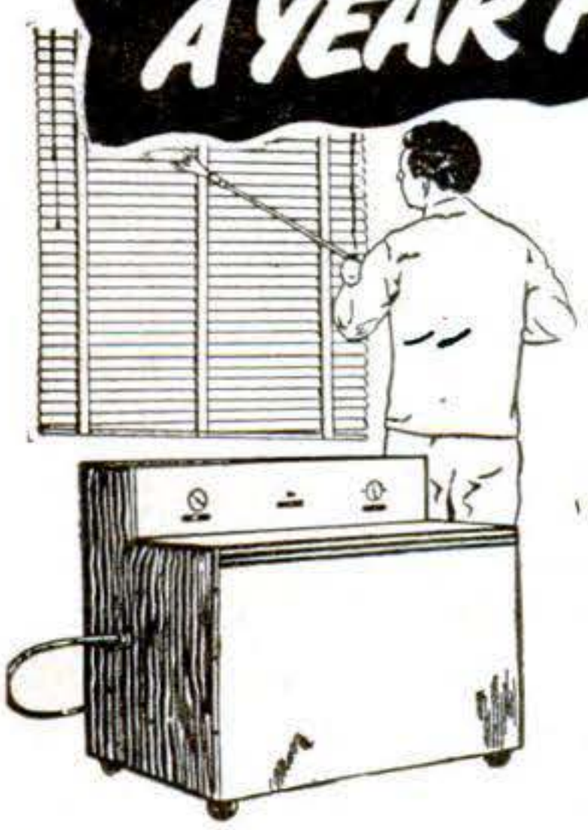
**GUARANTEED RECEPTION ON 3 SHORTWAVE BANDS PLUS STANDARD BROADCAST**

Turn the knob and — presto! — Radio Moscow is pouring propaganda into your ears! Turn it again and hear music from Paris, or amateurs chatting, or an aircraft control operator! Thousands have discovered a whole new world of listening pleasure with the "Mighty Midget," by the makers of radio equipment for the famed Kon-Tiki Expedition. Write for details and name of nearest supplier, or see October issue page 10.

**NATIONAL COMPANY, INC.**
**61 Sherman St., Malden, Mass.**

---

# BUILD A $15,000 A YEAR FUTURE!



## IN THE EXCITING NEW BUSINESS OF LAUNDERING VENETIAN BLINDS

There is big money to be made cleaning Venetian Blinds and a permanent, fast growing, Lifetime Business, besides.

An amazing new kind of business of your own in a field that is growing like mad. Millions of Venetian Blinds need laundering at regular intervals. With our new patented machine, you can start small—using your basement, garage or utility room to begin with. You can expand as your business increases by leaps and bounds. Income up to $200.00 daily already being made by others. Small investment for equipment starts your own lifetime business—and monthly payment plan permits you to pay for it as you grow.

**FREE** Get all the facts about this sensational new kind of machine that launders blinds so fast that your charges are unbelievably low. People would rather send blinds to you than do the work themselves. Yet, you make 700% profit on every blind you clean. Get names of successful owners near you. Get details of the full amazing plan without obligation. Be first in your territory to start a business that has brought $15,000 PROFITS the first year to others. Wire today or send name on postcard.

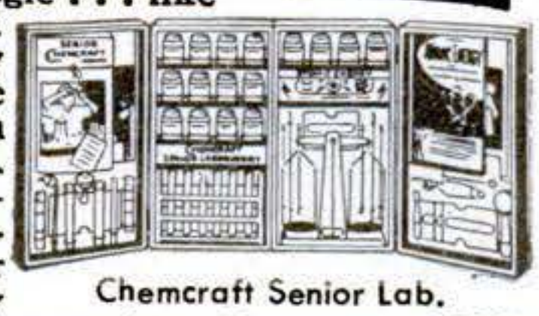
**VENETIAN BLIND LAUNDRY EQUIPMENT CO. INC.**
**442 N. SENECA ST. DEPT. 1212 WICHITA 12, KANSAS**

---

# BOYS-IT'S FREE!

**...NEW, EXCITING 16-PAGE BOOK on magic and marvels of chemistry**

Shows you how to amaze friends with eye-opening tricks of chemical magic . . . like changing water to blood and blood to stone. Tells you how to do many fascinating home experiments and shows you the big, new Chemcraft outfits. Describes fun, thrills, adventure you can have with a Chemcraft chemistry outfit of your own. Send now for free copy to Porter Chemical Co., 53 Prospect Ave., Hagerstown, Md.



Chemcraft Senior Lab.

**HEY FELLAS! ask Dad for CHEMCRAFT**

---

**EYE GLASSES *by* MAIL As low as $1.95**

**WRITE for FREE CATALOG with 14 LENS SAMPLE CARD**

*Thousands of Customers*
Est. 1939

QUALITY READING-MAGNIFYING OR BIFOCAL GLASSES FOR FAR AND NEAR

**ADVANCE SPECTACLE COMPANY, Inc.**
**537 S. Dearborn St., Dept. SP-12 Chicago 5, Illinois**

---

# HYPNOTIZE

Yes. Anyone. Modern speed hypnotism taught. Methods revealed. You are shown exactly what to say and do. Photo illustrated. Many interesting experiments. Self-hypnosis is fully explained. Amazing results. Detailed hypnotic tests given. Learn this exciting fascinating art. Hold your friends absolutely spellbound. Entertain.

*A professional hypnotist tells you his secrets.*

Free catalog of new hypnotism books sent on request.

**Send for the startling book "HYPNOTISM REVEALED"** → **$1**

78 RPM Phonograph Record Inducing Self-Hypnosis & Group-Hypnotism → **$5**

Thought of using sleep for learning, self-development? Send for new intriguing book, "Mental Power Through Sleep Suggestion." → **$1**

These two books are also available at all local bookstores.

**MELVIN POWERS, Master Hypnotist, 1324 Wilshire, Dept. 96 Hollywood 17, Calif.**

---

# PILES Try Page's Palliative PILE PREPARATIONS

If you are troubled with itching, bleeding or protruding piles, write for a **FREE** sample of **Page's Palliative Pile Preparations** and you may bless the day you read this. Don't wait. WRITE TODAY!

**E. R. PAGE CO., Dept. 45K1, Marshall, Mich.**

---

# COLD ROOMS?

## HIGH FUEL COSTS?

***FURNACE BLOWER—LIMITED TIME!***

Install in your cold air return, high volume blower, quiet belt drive, long hour duty motor, thermo overload, protected sight feed oil gauge, balance blower wheel, adjustable motor pulleys, self-aligning bearings. **$26.95**

**Blower, complete with Mtr. & Drive $44.95**

**FANS**

→ Kitchen Ventilators, Exhaust Fans, Attic Fans, Blowers, Heat Boosters. $7.95 up. Desk Fans, Window Fans, Blades, Guards, Shutters, Motors, etc.

*Dealer inquiries invited*

EDWARDS, BROS. ESTAB. 20 YEARS

**WESTAIR FAN AND BLOWER CO.**
**5650 Grand River Ave., Dept. 6, Detroit 8, Mich.**

Copyrighted material

JUST IN TIME FOR XMAS

## GIANT BALLOONS

Genuine govt. surplus weather & target balloons. Have fun or make money with 'em. Great sport in back yard or for parties, picnics, dances, fairs, etc. Great attention getters, it'll bring crowds to business events, conventions, exhibitions, trade shows; for lodges, civic occasions or school functions. Thousands of satisfied customers from coast to coast. Order now at these low prices.

3 Ft. Dia. 49c —6 Ft. Dia. 79c —13 Ft. Dia. $1.39

"Marksman"
## AIR PISTOL

It's a target pistol but it looks, feels, muzzle loads and cocks like an army .45. You can have fun indoors in rumpus room or basement; or out in the back yard or woods. Make it a test of skill and "out-marksman" your friends. Caliber .177, accurate, high-powered, guaranteed. Complete with free supply of BB's, darts & pellets. Full payment must accompany order. $5.95

EXTRA AMMUNITION AVAILABLE

Darts, 50c doz.—BB's, 15c for 150—Pellets, $1.50 for 500

• *All items add 10% for handling & delivery*
*Calif. residents please add sales tax*

WAR ASSETS DIV. VOLUME SALES CO.
Dept. S-12-52, 3930 Sunset Blvd., Los Angeles 29, Calif.

SEND FOR THIS FREE!

Make money. Know how to break and train horses. *Write today for this book FREE*, together with special offer of a course in Animal Breeding. If you are interested in Gaiting and Riding the saddle horse, check here ( ) *Do it today—now.*

BEERY SCHOOL OF HORSEMANSHIP
Dept. 5812 Pleasant Hill, Ohio

## CASH EASY IN YOUR SPARE TIME!

Turn spare hours, evenings, weekends into ***Money!*** Take orders from friends, neighbors, others for world-famous Stark Fruit Trees, Shrubs, Vines, Roses. Enormous demand for new Quick-Bearing Apple, Pear, Peach, other trees. U. S. Patent Leaders including sensational DWARF trees. SUCCEED with 137-year-old company.

**FREE** Giant MONEY-MAKING Sales Outfit It's yours—FREE. Send no money. No experience needed. GIANT DEMONSTRATION OUTFIT *PLUS* beautiful natural color Photo Plate Book sent at once. Rush name, address—start earning quick!

Stark Bro's Desk 2963, LOUISIANA, MISSOURI

TREASURE -- $10,000

New locator detects metals, valuable minerals and buried treasure. Money-back guarantee of superiority.

Also geiger counters. Govt. reward of $10,000 for uranium discovery. Write for FREE information.

THE GOLDAK COMPANY
1544 W. GLENOAKS BLVD., GLENDALE 1, CALIF.

BRAND NEW

## 30 DAY FREE TRIAL

High Power
**BINOCULARS**

Finest Precision Optics
Featherlight
Money Back Guarantee
Easy Pay Plan
Leather Case Incl'd.

33 MODELS $14.95 up

*Free!* Catalog & Book "How to Select Binoculars"
Dealer Inquiries Invited

BUSHNELL *Binoculars*
Bushnell Bldg., Dept. P52
Pasadena 1, Calif.

FREE GUIDE "How to Select Binoculars"

NAME _____ CITY _____

ADDRESS _____ STATE _____

# FRAM FILTERS

**get your oil cleaner, clean it faster, keep it clean longer than any other popular make filter. Always insist on genuine Fram Filters.**

FRAM
OIL • AIR • FUEL • WATER
FILTERS

*Call Western Union by number and ask Operator 25 for the name of your nearest Fram Dealer.*




Copyrighted material

# YOUR HIGH-PAYING

*interesting career in*

# TELEVISION

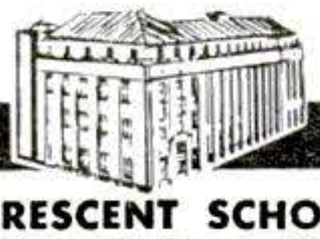
*starts here!*

## HOME STUDY COURSE

*with one of America's largest schools*

There's a place for YOU in the tremendous, billion-dollar Television, Radio & Electronics industry! It's so easy to get started with the famous CRESCENT SCHOOL course. Learn in your spare time . . . illustrated, simplified lessons and kits to practice on. No previous training needed. Send for FREE sample lesson . . . make this day the day you started on your way to a brilliant career!

Complete parts kits included. Build your own TV SET!



APPROVED FOR KOREA VETS

**SEND COUPON TODAY!**

**CRESCENT SCHOOL** Dept. A12
500 Pacific Street, Bklyn. 17, N. Y.

Sirs: Rush your FREE sample lesson and full details about the CRESCENT SCHOOL Home Study Course — at no obligation to me!

NAME _____

ADDRESS _____

CITY _____ ZONE ____ STATE _____

---

# You'll be happier in a FORD

---

# I GAINED 53 LBS. OF SHAPELY POWER-PACKED MUSCLES

*says Roger Hirsch, N. Y.*

*NOW* *BEFORE*

## 2 Which of these ME'S is YOU?

"That 112 lb.—6 ft. spindle-armed SISSY at right was ME a few short weeks ago", says Roger Hirsch. Look at him NOW! I gave him 53 lbs. of MIGHTY MUSCLES, added 6½ inches to his CHEST, 3 inches to each ARM! They don't call him SKINNY any more!

NO! I don't care how skinny or flabby you are. All I want is 10 minutes a day in your home to make you over by the same method I turned myself from a wreck into a Champion of Champions. You'll become an ALL-ROUND, ALL-AMERICAN, HE-MAN, A WINNER in everything you tackle—or my training won't cost you one cent.

ROGER HIRSCH was a 112 lb. 6 ft. WEAKLING. Look at him NOW!

SEND ME ONLY **10¢** for all **5** PICTURE-PACKED HE-MAN BUILDING Courses and also get

**Both FREE** 1. PHOTO BOOK OF STRONG MEN 2. A MUSCLE METER

"Win This 15" Silver Trophy as I did." Roger D. Hirsch

**JOWETT INSTITUTE, Dept. PS-212**
**220 Fifth Ave., New York 1, N. Y.**

Dear George: I enclose 10c for which please send me on trial all 5 picture-packed HE-MAN Building Courses, FREE Photo Book, and Muscle Meter.

NAME..... AGE.....
(Please print plainly. Include Zone Number)

ADDRESS..... No C.O.D.'s

CITY..... ZONE.... STATE.....

---

# OWN Your Own Business

# $5 per hour

**Clean and Mothproof rugs and upholstery** "in the home" or public buildings. If now employed, you can operate in spare time and build up a permanent profitable full-time business. Alert dealers can average $5 hourly gross profit on service they render and $3 on **EACH** of their servicemen at National Price Guide charges. Easy to learn . . quickly established.

**DURACLEAN** cleans by absorption! No scrubbing, soaking or shrinkage. Dirt and grease vanish . . matted pile rises . . colors revive. Furnishings used again same day.

**DURAPROOF** resists moths and carpet beetles. Your service backed by a National Money Back 4 Year Warranty.

We furnish enough material to return your total investment in War-proof Business. EASY TERMS. Send for **FREE** booklet TODAY.

**DURACLEAN CO.**
**2-18D Duraclean Bldg. Deerfield, Ill.**

---

# RUPTURED?

## Get Relief This Proven Way

Why try to worry along with trusses that gouge your flesh —press heavily on hips and spine—enlarge opening—fail to hold rupture? You need the Cluthe. No leg-straps or cutting belts. Automatic adjustable pad holds at real opening — follows every body movement with instant increased support in case of strain. Cannot slip whether at work or play. Light. Waterproof. Can be worn in bath. Send for amazing **FREE** book, "Advice To Ruptured" and details of liberal truthful 60-day trial offer. Also endorsements from grateful users in your neighborhood. Write:

**CLUTHE SONS, Dept. 14, Bloomfield, New Jersey.**

---

# ANALYZE HANDWRITING

**MORE INCOME . . . MORE PRESTIGE AND MORE SUCCESS!**

FASCINATING, uncrowded profession - business, full or spare time. Free illustrated lesson and yearbook shows how men and women in home and business find opportunity in analyzing handwriting. *Understand People—Make Money.* Free lesson and information about amazing opportunities if over 21.

**I. G. A. S., Inc., 810 Wilhoit Building, Springfield, Missouri**

---

# HYPNOTISM

Learn to apply this tremendous POWER. Develop will-power, self-confidence, self-control. ANYONE can master this exciting profitable profession in short time by training at home, with GUARANTEED RESULTS. DON'T DELAY . . . Write to America's oldest Hypnotic school for free information now—today!

**INSTITUTE OF APPLIED HYPNOLOGY**
**Dept. 212, 120 Central Park So., N. Y. 19, N. Y.**

---

SAVE MONEY **TEST YOUR OWN RADIO AND TELEVISION TUBES AT HOME!!!**

*Pat. Pending*

**ALSO AVAILABLE!**
**CONDENSER TESTER**
Checks Shorted, Open and Leaky Condensers..... $6.98

**CONDUCTANCE**
# TUBE TESTER

No Tube Manual or knowledge of tubes necessary—Tests **All** Tubes—100% accurate for direct shorts, opens, burned out tubes.

**$4.98** Buy it—Try it—If not satisfied, return in 5 days —Money cheerfully refunded.

**SEND NO MONEY** — ORDER C.O.D. plus postage, or send check, cash or money order & we pay postage.

**E-Z TESTER CO.**
**(Dept. PS-12) MACON, GA.**



Copyrighted material

# DO IT TODAY! SWITCH TO

MILD

# KENTUCKY CLUB

*"Look! Another man switched to Kentucky Club—the thoroughbred of pipe tobaccos."*

**Notice how much better your pipe tastes—how much fresher your mouth feels when you switch to Kentucky Club. Look for the blue tin with the picture of the red-coated rider. Send for free catalog showing fine pipes and how to get them at big savings. Mail Pouch Tobacco Co., Wheeling, West Va. Dept. 102**

MANUFACTURE

**BUILDING BLOCKS** Easy to start your own profitable business. General high speed, low cost Concrete Vibrator Block Machine produces 1000 blocks in 8-hour day. All sizes and shapes. Complete details FREE. Mail $1 for wonderful book, "How to Build Your Own Concrete Block Home."

Only $218 Less Motor

**GENERAL ENGINES CO.**
307 HUNTER ST., S-122 GLOUCESTER, N. J.

*War Surplus* SAVE UP TO 85%

**ALTIMETERS** Pioneer sensitive altimeters. Range 0-35,000 ft., calibrated in 20 ft. increments. Barometric pressure setting adjustment. No hook-up required . . . ready for installation in auto or aircraft.

Used, Good, $12.95

**BLACK LIGHT KITS**

**FOR ULTRA-VIOLET FLUORESCENCE**

NOW...you can build your own black light equipment at a new low cost with these easy-to-assemble components. Geologists, mineral prospectors and hobbyists can easily make laboratory black lights for mineral identification. Signs, posters, pictures, fabrics, house numbers . . . anything painted with fluorescent paint glows with eye-appealing fluorescence under black light. KIT CONTAINS: Ultra-Violet tube, brackets, ballast, starter, wire, plug, wiring diagram.

**Special!** 4 Watt Kit—(5¼" tube)... Postpaid ... $3.00
8 Watt Kit—(12" tube).... ... $4.00

All Equipment F.O.B. Pasadena • Enclose Full Amount with Order

C and H Sales Company
Box 356-DS East Pasadena Station • Pasadena 8, California

# Start As High As $3,795.00 A YEAR

**MEN—WOMEN**

- Postoffice Clerks-Carriers
- Railway Postal Clerks
- Stenographers
- Typists
- Accountants
- Immigrant Inspectors
- Customs Inspectors
- Many Other Early Jobs

Veterans Get Preference

MAIL COUPON TODAY SURE

COUPON

**FRANKLIN INSTITUTE**
(Not Government Controlled)
Dept. R-80,
Rochester 4, N. Y.

Gentlemen: Rush to me, FREE of charge, list of U. S. Government big pay jobs. Send FREE 32-page book describing salaries, vacations, hours, work, etc. Tell me how to qualify for one of these jobs.

Name.....
Street.....
City.....Age?.....




Copyrighted material

WHICH DO YOU WANT?

GET THEM ALL! LEARN . . .

# DRAFTING

EASILY AND QUICKLY AT HOME IN YOUR SPARE TIME

You Get This Professional Set of Instruments at no Extra Cost

You can be free of money troubles when you enjoy the unlimited opportunities open to skilled draftsmen. CEI training, under licensed professional engineers, quickly gives you the necessary technical background to fill the growing, desperate need for draftsmen. Thousands have succeeded; you can too, with a CEI diploma. We guarantee to train you until you qualify. Get full information today.

CLEVELAND ENGINEERING INSTITUTE

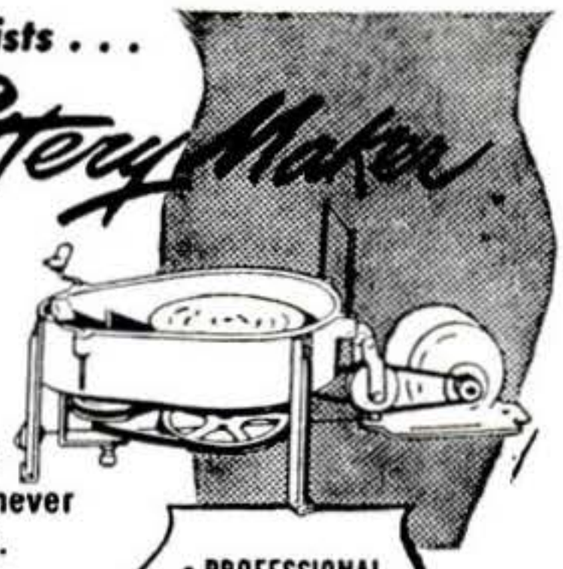
FREE 1952 SUCCESS BOOK

Cleveland Engineering Institute
Extension Division PS12B
6300 Euclid Ave., Cleve. 3, Ohio
☐ Aeronautical ☐ Mechanical
☐ Training in Cleveland
NAME.....
ADDRESS.....
CITY.....STATE.....
Paste on 2 penny postcard



For Ceramic Hobbyists . . .

NEW B & I *Pottery Maker*



Now . . . enjoy ceramics at home . . . make a wide variety of useful, artistic pottery and ceramic objects for pleasure, for profit. New power-driven Pottery Maker offers professional features never before available at this price. Portable, mounts anyplace . . . precision built for expert results. Order by mail or write for complete details.

• PROFESSIONAL TYPE
• POWERDRIVEN
• VARIABLE SPEED

at only $57.50 less motor f.o.b. factory

**B & I Manufacturing Co.**
Dept. M, Burlington, Wisconsin



# SHORTHAND in 6 Weeks at Home

Famous Speedwriting Shorthand. 120 wpm. No symbols; no machines; use ABC's. Easiest to learn; write and transcribe. Low cost. 150,000 taught by mail. For business and Civil Service. Also typing. 30th year. Write for FREE booklet to:

*Speedwriting*®

Dept. 2612-2, 55 W. 42 St., New York 36



# PLAY GUITAR IN 7 DAYS OR GET MONEY BACK

Let Ed Sale, top Radio Guitarist, teach you to play a song the very first day, and **any** song by ear or note in 7 days! His famous book contains 52 photos, 87 chord charts, etc. Shows how to tune, keep time, build chords, bass runs, dance chords, swing, etc., plus 110 Popular Songs, words and music. Surprise friends, relatives. Popularity and fun galore. **SEND NO MONEY!** Just name and address to Ed Sale and pay postman **$1.98** plus C.O.D. postage (or send **$2** with order and I pay postage. Same guarantee). **ED SALE, Studio 1803, POINT PLEASANT, N. J.**



ILLUSTRATED COMIC BOOKLETS POCKET SIZE!

*THEY'RE TERRIFIC!* PACKED WITH RARE CARTOONS *and* GOOD CLEAR ILLUSTRATIONS AS YOU LIKE IT. RICH IN FUN *and* HUMOR. *20 BOOKLETS* ALL DIFFERENT, SENT PREPAID FOR $1 IN PLAIN SEALED WRAPPER. NO C.O.D.s.

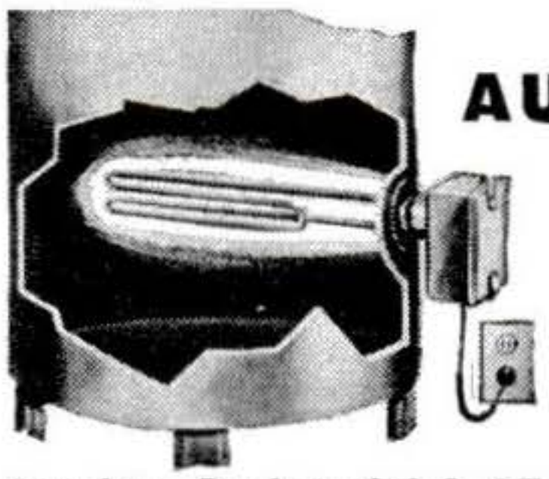
**NATIONAL, Dept. 478, BOX 5-STA. E, TOLEDO 9, OHIO**



New Low Cost Electric Water Heater Gives You

# HOT WATER AUTOMATICALLY

*From Your Present Tank!*



- No dirt, grime, soot, flame!
- SAFE! Every part UL approved!
- Install in 10 Minutes, or less!
- No new tanks or plumbing required.
- Works automatically—saves on fuel bills!

New, UL approved LECTROMATIC changes gas, coal or oil-burning water heater into modern ALL-ELECTRIC unit! Turns on automatically when needed, shuts off automatically when water is heated. To install, simply shut off water. Remove plug from water tank. Screw LECTROMATIC into opening (as shown), then PLUG IN! Plenty of hot water all day long. Uses only ¼-½c electricity per gal. of hot water. Temp. adjustable from 100 to 180 degrees. Save postage. Send check or money order for $19.95 now. Money back in ten days if not delighted. Full one year guarantee! ORDER NOW!

**Complete—Ready to Plug In—Only $19.95**

**COLLOID EQUIPMENT Co. Inc.** Dept. PS-12, 50 Church Street New York 7, N. Y.



Something New In Foot Care

# Bactine

BRAND Reg. U. S. Pat. Off.

for ATHLETE'S FOOT

*Tired Aching Feet*
*Sore, Itching Feet*

fresh clean odor

- KILLS FUNGUS GERMS (causing 90% of ATHLETE'S FOOT)
- GUARDS AGAINST REINFECTION
- SOOTHES ITCHING and SORENESS
- SANITIZES and REFRESHES
- GREASELESS
- DOESN'T STAIN

Guaranteed by Good Housekeeping — REPLACEMENT OR REFUND OF MONEY IF NOT AS ADVERTISED THEREIN

# Bactine

BRAND Reg. U.S. Pat. Off.

ALL DRUG STORES 3 CONVENIENT SIZES

MILES LABORATORIES, INC. ELKHART, IND.




Copyrighted material

SAVE UP TO 50% AND MORE

OUT OF PAWN

# GENUINE DIAMONDS

VALUES FROM $10 TO $10,000

TIME PAYMENTS ARRANGED

Send for Illustrated FREE Catalog

All diamonds reset in brand new modern mountings. Sold with a written iron-clad money back guarantee. Over 100,000 satisfied customers have bought diamonds from Berman's.

Our Reference — Your own Bank or any Mercantile Agency

Diamonds from estates, banks, unredeemed pledges offered at substantial savings

**Berman's Diamond Loan Bank**

*Dept.* PS – BERMAN BLDG., BALTO. 1, MD.

**BOYS! MAKE YOUR OWN RADIO**

Make your own simple, tubeless, batteryless Crystal Radio. SEND 25c for a GENUINE MELOMITE CRYSTAL with complete illustrated instructions for making your own set. Crystal sent postpaid with instructions and our own publication, "THE MAGIC CRYSTAL" which is full of news, diagrams, questions and answers of interest.

**SEND 25c FOR YOUR CRYSTAL TODAY!**

**ALVA ALLEN RADIO Dept. PS-12 Clinton, Mo.**

**Bar Bells**

BUY DIRECT FROM FACTORY

Write for free booklet and price list

$8.95 up

INDEPENDENT IRON WORKS
2416 East 23rd Street, Dept. "C"
Los Angeles 58, Calif.

HOW MISERY MAY

# RUPTURE DISAPPEAR

**FREE Sample, Send for It Today**

FREE. Get this Amazing TREATISE. You may never need wear your old truss again. Shows you how it works. For reducible rupture. Positively costs you nothing. No obligation. Do not wait. Just 500 Free Sample copies. Supply limited. Send for yours today. Hurry, write to **VITA-PNEUMATIC Co., 132-A Pneumatic Bldg., 2 Ridge St., New York 2, N. Y.**

**ACCORDIONS AT LOWEST WHOLESALE PRICES**

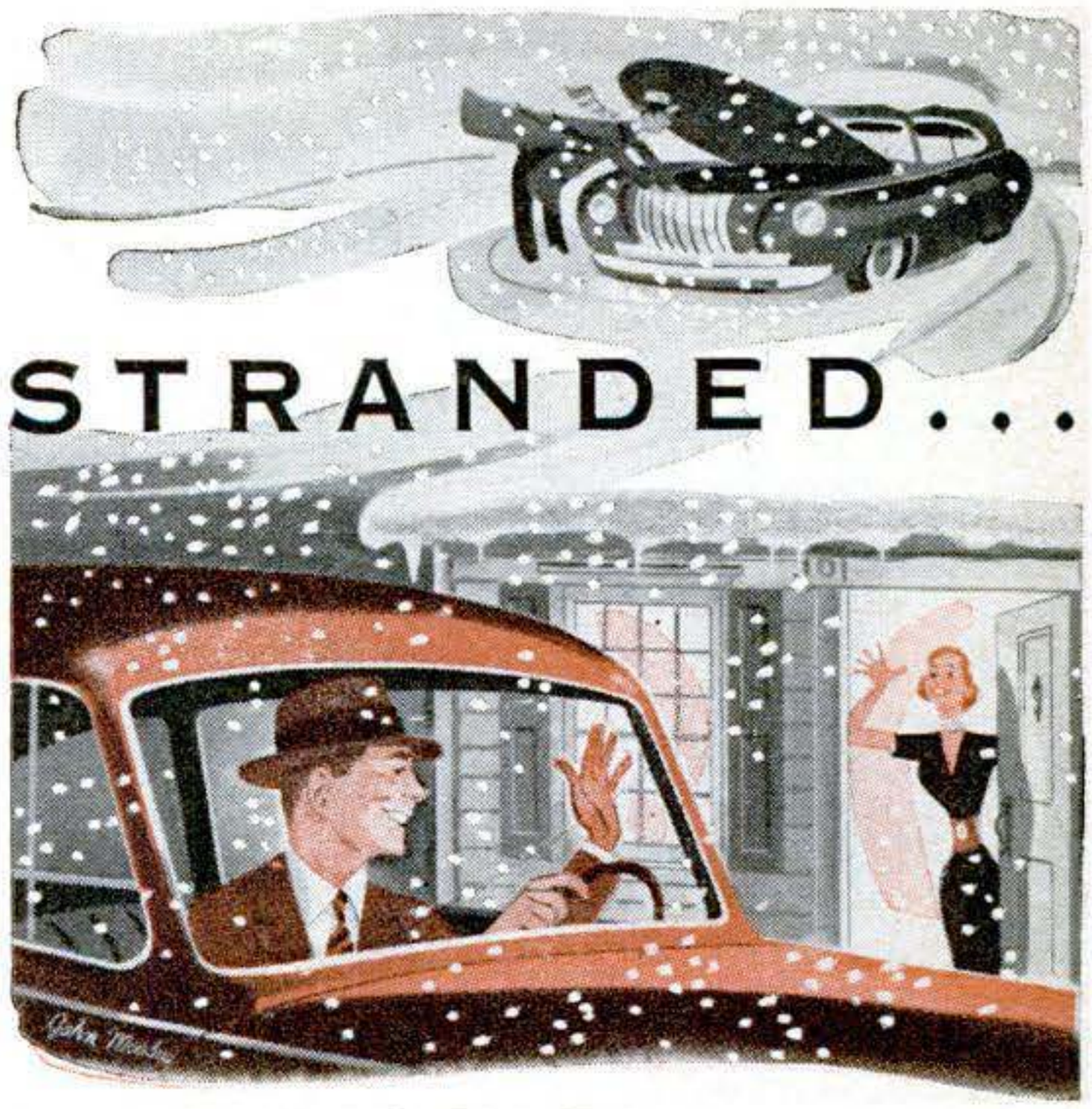
5-DAY FREE TRIAL

"PAY AS YOU PLAY"
Small Down Payment
As Little As
$10.00 per month

**DIRECT from Importer to You!**

SATISFACTION GUARANTEED, or your money back! NOW you can save up to 50% by direct purchase from America's leading distributor of famous genuine ITALIAN ACCORDIONS. Send for FREE Illustrated Catalog

**ACCORDION MANUFACTURERS & WHOLESALERS OUTLET**
**2003 West Chicago Ave. Dept. P-12, Chicago 22, Ill.**



# STRANDED...

# OR SAFELY HOME

## This Winter Your Fuel Pump Can Make the Difference

Depend on a

# CARTER FUEL PUMP

POWER CENTER ™

Why run the risk, when a Carter Fuel Pump is your best possible insurance against fuel pump failure? Its superior performance is proven every day where the going is toughest — on New York City Taxicabs and cross-country truck fleets.

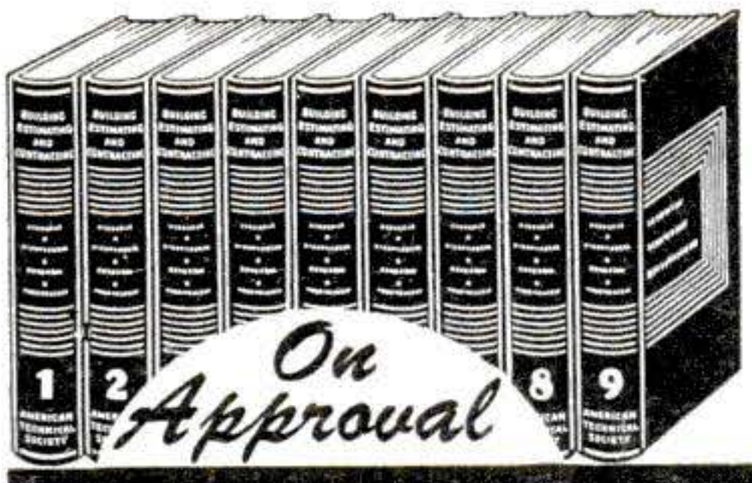
*Ask your mechanic*—the man who knows — he'll recommend Carter.

*You Get a Liberal Trade-In Allowance on Your Old Fuel Pump*

**CARTER CARBURETOR CORPORATION**
St. Louis 7, Missouri
*Division of American Car and Foundry Company*



Copyrighted material




SEND NO MONEY • MORE THAN 4000 PAGES • 2750 PICTURES

## 9 BIG COMPLETE BOOKS BUILDING, ESTIMATING, CONTRACTING

Examine this Up-to-Date Edition for 10 days. See how these nine books supply easily understood training that will help you to get a *better job* and make *more money*, or start a profitable business for yourself. Think what a BIG help it will be to have them handy for use in solving all sorts of building problems.

Learn to draw plans, estimate, do all-new construction and modern remodeling to meet fast growing demand. More than 4000 pages of practical, pay-raising information with 2750 helpful illustrations, on such subjects as blueprint reading, concrete forms, masonry, carpentry, steel square, electrical wiring, plumbing, heating, painting, and *hundreds more.*

In our more than 50 years we have never offered more complete building information. Send the coupon TODAY.

(A year's consulting privileges with our engineers now given with these books without extra cost.)

**AMERICAN TECHNICAL SOCIETY—Publishers Since 1898**
**Dept. G920, Drexel Ave. at 58th St., Chicago 37, Ill.**

I would like to examine your 9-Volume Set of Building, Estimating, Contracting Books. I will pay the delivery charges only, but if I choose I may return them express collect. If after 10 days' use I prefer to keep them, I will send you $3 plus postage and pay the balance at the rate of only $4 a month until $34.80 has been paid. Include consulting service as offered above.

Name_____

Address_____

City_____ State_____

Please attach letter giving employer's name and address (if self-employed give business man reference). Men in service please give home address.

## THE ONLY SPARK PLUG WITH PATENTED CORALOX INSULATOR

IT'S FUN TO LEARN

## by LINGUAPHONE

***World's Standard Conversational Method***

**FRENCH GERMAN SPANISH RUSSIAN JAPANESE ITALIAN NORWEGIAN**

**29 languages available**

A Linguaphone Language Set is a lasting gift—an invaluable asset in business, travel, school, armed services and social life. With LINGUAPHONE you LISTEN and LEARN another language the same **easy**, natural way you learned your own—**AT HOME** you **hear** native men and women make everyday conversation—you **Understand**—YOU SPEAK! Over a million home-study students of all ages. Mail coupon TODAY for FREE Book.

**LINGUAPHONE INSTITUTE, 147-12 Radio City, N. Y. 20**

LINGUAPHONE INSTITUTE
147-12 Radio City, New York 20, N. Y.
Send me your FREE Book.
LANGUAGE INTERESTED.....
NAME.....
ADDRESS.....
CITY.....ZONE.....STATE.....
☐ Check here if Korea Veteran.

## New WRIST WATCH with Amazing MECHANICAL BRAIN

***• It Remembers • Tells Time • Tells Date!***

Measures Speed. Measures Distance. Records up to 12 Hours. OVER 40 QUALITY FEATURES. Precision Jeweled. Imported Swiss Movement. Accurate.

Push-Button Stop & Start. Red Sweep-Second Hand. Unbreakable Crystal. Triple Chrome Plated Case. Shock Resistant. **NITE-VUE RADIUM GLOW DIAL.** Anti-Magnetic. Times Shop work. Times Photography. Times Sports. Times Races. Times Lab. work. Times Planes. Smart Expansion Band Included.

Includes 1 year guarantee and Lifetime Service Certificate.

Compare It at $50.00
SPECIAL OFFER **$8.95** Plus 90c Fed. Tax

SEND NO MONEY

Pay postman plus postage or send cash, check, or money order, we pay postage. Keep 10 days. Return for full refund of purchase price if not fully satisfied.

**YOUNG PRODUCTS, Dept. 716**
**2605 ELMHURST, DETROIT 6, MICHIGAN**

## PARTS FOR MILITARY TRUCKS

**FOR JEEP, DODGE, CHEV., GMC, STUDEBAKER, 4 WHEEL DRIVE AND 6 WHEEL DRIVE. ALSO PARTS CATALOG. WRITE**

### NEW AXLES FOR TRAILERS

Surplus . . . H.D. axles suitable for building many types of trailers, farm wagons, etc. Standard width straight axle, 2 inch square, complete with Hubs, Timken bearings, 6 hole 750x20 or 825x20 wheels, without brakes, only (Dual Wheels $15 extra) ..... **$69.50**

### NEW JEEP TOPS and CURTAINS

Military type, easily adapted to civilian type Jeep. Complete top & back curtains, side curtains, snapon doors, 5 windows. Waterproof, OD color. 25 lbs. FOB. KC ..... **$59.50**

*All Prices F.O.B. K.C. 25% dep. Required on COD's*

**UNITED AUTO PARTS CO., Inc.**
**1901 TROOST AVE. KANSAS CITY, MO.**

## "PLASTICS FABRICATING MANUAL"

New book shows you how to work in Plastics for fun and profit! Jam packed with "How to do it" illustrations. Learn latest methods of carving, sawing, cementing, polishing, casting, drilling every type of plastic including Lucite, Acetate Plexiglas, Catalin, Bakelite, etc. A real gold mine for advanced workers or beginners. Shows how to make hundreds of useful and decorative items from plastic sheets, rods, tubes and casting resins. Manual also contains complete illustrated catalog of our line of plastic hobby supplies including plastic stock sheets—rods—tubes—casting resins—cements—dyes—tools and project plans. Send 25c for this valuable manual. Edition limited—act fast!

ONLY **25c**

**HOUSE OF PLASTICS, 8648 Linwood, Dept. PS-2, Detroit 6, Mich.**

- MADE OF HEAVY PLATE STEEL
- UNIVERSAL—FITS ALL EXHAUSTS

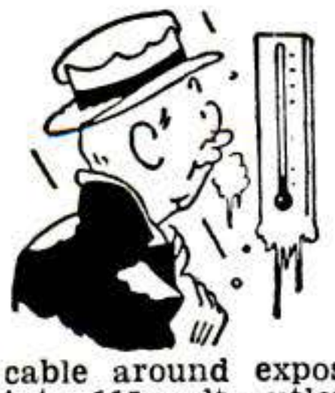
*NEW! EXCITING!*

## JET EXHAUST CUT-OUT

Now your car can sound off those exciting, dynamic tones—easily controlled mechanically from your dashboard. Channel your exhaust through special pipes or muffler without removing your original muffler. Easily installed, MONEY BACK GUARANTEE

*Send $4.95 check, cash, money order (postpaid) or C.O.D. plus postage to:*

**FUR SALES, 1031 E. 63rd St., Chicago 37, Ill., Dept. PS**
**DEALER INQUIRIES INVITED**



## NO FROZEN PIPES

### When You Use WRAP ON ELECTRIC HEATING CABLE Protects to 35° *Below* Zero

No more worry, expense or inconvenience from frozen pipes! Just wrap plastic coated cable around exposed or shallow underground pipes and plug into 115 volt outlet. Maintains low heat—like electric blanket. Uses only small current. Thermostat turns on only when needed. No radio or TV interference. Low prices—complete with connections. Satisfaction or money back.

**G-Q ELECTRIC SEED BED HEATER.** Seeds are up in 30 hours—root cuttings in 6 days. You cut germination time 2/3—transplant 2 weeks sooner. Uses house current. Thermostat control. Easy installation. Write for catalog and FREE folder on seed bed construction.

**GRO-QUICK SALES**
**10342 Lanark Ave.—Dept. 43-3, Detroit 24, Mich.**
**Tuxedo 5-5828**

*Free Catalog*



Copyrighted material

## ESSENTIAL IN PEACE OR WAR

# AVIATION

- MASTER A&E MECHANIC
- PILOT AND SPECIALIST
- DRAFTING AND DESIGN

The aviation industry urgently needs properly trained young men for essential civilian aviation positions. Embry-Riddle offers maximum training in minimum time. Fully accredited 6-month to 2-year courses in all aeronautical phases also aid rapid military advancement if called to armed forces. Thorough, practical instruction backed by 25 years' experience training today's aviation leaders. Complete school campus. Training authorized under G.I. Bill. Enroll today!

Illustrated catalog, address:
Registrar, Dept. 91, Miami 30, Fla.

Embry-Riddle International SCHOOL OF AVIATION

**TRAIN IN MIAMI -- AIR CAPITAL OF THE WORLD**

# CARBURETOR TOO RICH
## MAKES MOTORIST TOO POOR

Car owners who are wasting money, getting poor gas mileage due to over-rich mixtures, will be pleased to learn how to save gasoline by **VACU-MATING OVER-RICH MIXTURES.** Vacu-Matic fits all cars, trucks and tractors. *Automatic* and operates on the supercharge principle. Easily installed in a few minutes.

**SALESMEN WANTED! Big Profits**

For FREE particulars, how you can install one on your own car for introducing, just send your name and address on a postcard to **VACU-MATIC, 7617-1966 W. State St., WAUWATOSA, WIS.**

# FREE FOR ASTHMA

If you suffer with attacks of Asthma and choke and gasp for breath, if restful sleep is difficult because of the struggle to breathe, don't fail to send at once to the Frontier Asthma Company for a FREE trial of the FRONTIER ASTHMA MEDICINE, a preparation for temporary symptomatic relief of paroxysms of Bronchial Asthma. No matter where you live or whether you have faith in any medicine under the sun, send today for this free trial. It will cost you nothing.

FRONTIER ASTHMA CO. 326-T FRONTIER BLDG.
462 NIAGARA ST. BUFFALO 1, N. Y.

# STUDY AT HOME
## WITH AN EDUCATIONAL INSTITUTION

**Courses in ARTS AND SCIENCES:** Philosophy; Education; Letters; Public Health; Medical Jurisprudence; Psychology; Sociology; Physics; Chemistry; Geology; Pol. Science; Theology; Law; Business and Commerce; Accounting; Mathematics; Statistics; Agriculture. **ENGINEERING:** Electrical, Civil, Mechanical, Drafting, Architectural, Steam, Diesel, Aeronautical, Radio, Structural, Mining, Industrial, Petroleum, Refrigeration, Air Conditioning, Chemical. Send for free catalog.

**McKinley-Roosevelt Incorporated, 4610-A3, Sheridan Rd., Chicago 40, Illinois**

# OVERHAUL YOUR MOTOR *in 10 minutes*

**STOP BURNING OIL, STOP PISTON SLAP**
*With a Renew Treatment*

**1st Step—CLEANSE WITH "MOTOR PURGE"**—The "Purge" formula cleans, quiets and frees rings, valves and pistons from efficiency and power robbing carbon, gums and varnish. Pour this miracle solvent into the cylinders, run your motor and watch the combustion residue billow out of your exhaust pipe.

**2nd Step—RENEW WITH "COMPRESSION SEAL"**—RESTORE COMPRESSION . . . GET NEW POWER, SPEED AND ECONOMY with "Compression Seal"! Squeeze this self expanding mineral compound into your cylinder where it can fill worn spots (which cause compression leaks) between cylinder walls and pistons. Thus it restores compression . . . cuts oil-gas waste and eliminates costly engine overhaul and ring jobs.

**Free Auto Manual with each order. Kit treats all cars and trucks.**
**$6.95 Postpaid (or send $1 deposit, bal. C.O.D.)**

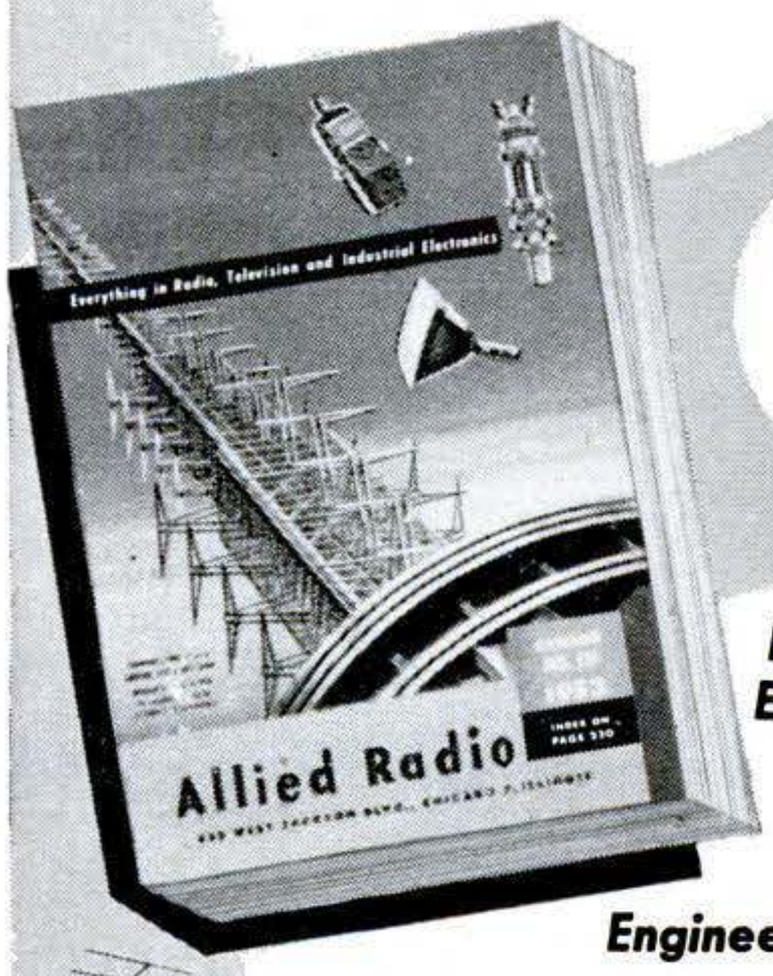
**CONSOLIDATED ENGINEERING, Dept. PSK-12,**
**10407 W. Washington Blvd., Culver City, Calif.**

## World's Most Complete!

# 1953 ALLIED
## TV & RADIO CATALOG

# FREE!

**Everything in TV & Radio At Lowest Prices**




**236 PAGES VALUE-PACKED**

***Everything for Experimenters, Builders, Amateurs, Servicemen, Engineers, Soundmen***

Send for ALLIED's big 236-page 1953 Catalog, the value-packed guide to *everything* in TV and Radio! Latest home radios, TV equipment, Amateur supplies, High-Fidelity Sound, P.A. Systems, new recorders, test instruments, builders' kits—plus the world's largest stocks of electronic parts, tubes, tools and books. Get more for your money—send today for your FREE 1953 ALLIED Catalog!

**SEND FOR FREE CATALOG**

# ALLIED RADIO

**ALLIED RADIO CORP., Dept. 7-M-2**
**833 W. Jackson Blvd., Chicago 7, Illinois**

☐ Rush FREE 1953 ALLIED 236-Page Catalog.

*Name*_____

*Address*_____

*City*_____ *Zone*____ *State*_____



Copyrighted material

GET 100 SHAVES FROM ONE BLADE

# REVOLUTIONARY RAZOR JOLTS Blade Industry

Just imagine! A highly precisioned chrome safety razor that sharpens its blades in SPLIT seconds by flicking your wrist. Users say it's a dream come true! Uses the same double edge blade you NOW have on hand. No need to buy fancy, expensive blades. No more quick dashes to drug stores. No more ripping, scraping and burning shaves. Employs the new scientific VELVET CUT method: a thrill in itself. And most important—no more throwing away of your hard-earned money! Cost is only initial – immediately after that it actually starts paying for itself, plus dividends in saving you the cost of all the extra razor blades you have been buying foolishly all your life. Tests show an average of over 100 shaves per blade. The secret is the precision built-in HONE that actually improves with wear. All orders received by Dec. 15th—Guaranteed to arrive before Christmas.

TRIPLE FREE OFFER

1—Handsome lifetime leatherette carrying case for your SHAKE SHARP.
2—Well over a year's supply of WORLD FAMOUS razor blades.
3—Plan of how to get FREE razor blades forever.

## MAIL NO RISK 30 DAY TEST COUPON

**VOLUME SALES CORP.** **Dealers Invited**
**1209 Oregon Ave., Phila. 48, Pa.** **(S)**

If you'll send me SHAKE SHARP on a NO-RISK long 30 day trial, it would be foolish for me not to try it. I can't lose. However, it must be EXACTLY as advertised or I will return it for an absolute refund.

Send me ☐ SHAKE SHARP razors. Also send me your TRIPLE FREE OFFER. In any event the TRIPLE FREE OFFER is mine to keep.
☐ Chrome Plated Model—$3.95 ☐ Gold Plated Model—$4.95
☐ I am enclosing check, M.O., or cash, saving myself all postal charges.
☐ Send C.O.D. I am willing to pay postage.
NOW! cut out this NO-RISK coupon, clip it on a separate sheet with your name and address PRINTED plainly.

**FOR YOUR POCKET'S SAKE MAIL COUPON NOW!**

---

*Do you work all day with*

# COLD FEET?

## NOW,

at last, a new, modern, low priced electric foot warmer that will keep you healthy, happy and comfortable

Help prevent colds with...
**ELECTRO MAT**

Check stand cashiers, secretaries, assembly line workers, housewives, office workers, theatre cashiers, machine operators, telephone operators, and many others throughout the country are now singing the praises of the Electro Mat. There is no further need to work all day with cold feet. Many colds, causing absenteeism and irritability, can be directly traced to cold feet.

## Be Comfortable, Happy and Healthy on Your Job During Cold Winter Months.

Consumes less power than a 75 watt light Bulb.

**Mail your check or money order today for ONLY**

**$6.95**
F.O.B. Los Angeles, California

**Send for your light-weight, portable Electro Mat today. Made of Quality Neoprene Rubber. Size 14" x 21".**

**You will agree it is the best investment you have ever made.**

*Safe and Economical*

**PETERSON RUBBER MAT CO.**
**5508 N. Halifax Arcadia, California**

---

Who me?

Yes, YOU can

# FIX TV AND RADIO TROUBLES YOURSELF

## Build Your Own Sets At Big Savings!

Yes, if you can turn a screwdriver, you can stop paying those $5—$10—$15 repair bills!

You can fix up your present set so that it works better than ever, or construct — at a mere fraction of the store price — that powerful, good-looking TV set, radio, 3-speed phonograph, or beautiful console combination you've always wanted!

For the first time, it's all made so downright easy and enjoyable, that even if you've never seen the inside of a TV set or radio before, you'll soon be making expert repairs and improvements of professional quality.

Here is EVERYTHING you need—a Radio Builder's Guide, Television Repair Manual, a Radio Trouble-shooting Bible, and a TV and Radio Shopper's Guide — all packed into one BIG, HELPFUL VOLUME. All this is yours for less than ½ the cost of a single service call! Convince yourself with generous 10 day FREE Trial!

**Simple Directions Show You How**

To build many AC-DC shortwave radios, 3-speed phonographs, portables.

Convert your old TV set to modern Giant Screen

Build clever midget radios

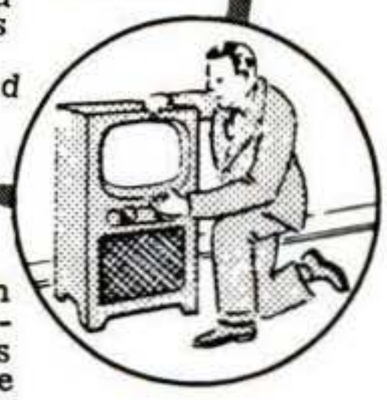
Construct television wave traps

Build television color converter

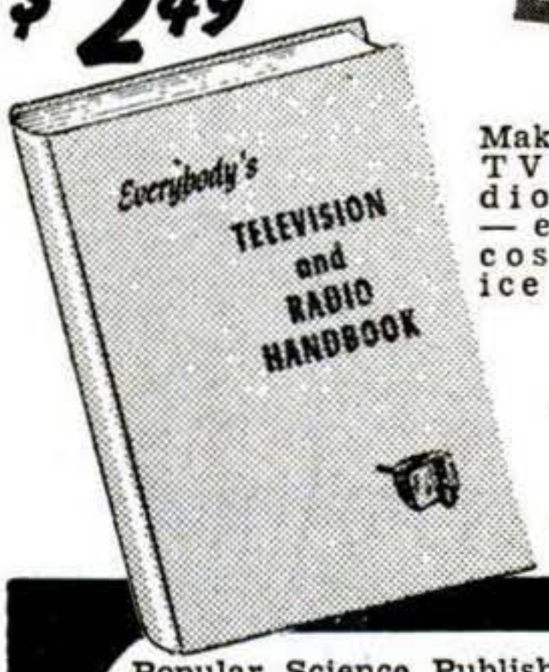
Double any radio's usefulness with inexpensive extension speakers

Rig up amazing electronic household servants

Do scores of other exciting TV and radio projects simply by following easy "show-me-how" directions and hundreds of diagrams and photos!



**Only $2.49**




Make your own TV and Radio repairs — eliminate costly service charges!

***256 Pages!***

***711 Illustrations!***

Popular Science Publishing Co. Dept. P S.-1252
353 Fourth Avenue, New York 10, N. Y.

Please rush me FREE Trial copy of EVERYBODY'S TELEVISION AND RADIO HANDBOOK. When it arrives I'll deposit only $2.49 plus postage with postman, as payment in full. Unless completely delighted, I may return book after 10 days FREE Trial, and get my money back.

NAME .....

ADDRESS .....

CITY ..... STATE .....

☐ Check here if you remit now. We'll pay postage. Same guarantee.



Copyrighted material

## ELECTRIC MOTOR BARGAINS!

**¼ HP Split Phase 110 Volts . . . 10.75**

**½ HP 1750 or 3450 RPM 19.75 1½ HP 3450 RPM 47.50**

**2 HP 3450 RPM 65.00 3 HP 3450 RPM 77.50**

*All prices F.O.B. Immediate Delivery*

***Every Motor Fully Guaranteed***

Heavy Duty, Repulsion Induction and Capacitor Types, 110 220 Volts (except 2 and 3 HP which are straight 220), 60-cycle, Single phase. Standard Makes (G.E., Wagner, Leland, Westinghouse, etc.). Rush your order **TODAY**—large stock of motors—1 & 3 phase, **32-v. direct current bargains. Prices f.o.b.**

## *Paramount* AIR COMPRESSOR

**COMPARE *Price—Features—Savings!***

Reg. $24.95. Ball bearing, piston-type compressor of revolutionary new design. Can't be matched as an all-purpose, low cost unit. New principle operates it on conventional ¼ HP—BUT delivers MORE air than ordinary ⅓ HP unit. For professional paint spraying, tire inflating, insecticiding and hundreds other uses in shop, farm, home! Delivers 2¼ cu. ft. air per minute. Includes Tank—Air Gauge and Air Regulator for adjusting pressure from 0 to 100 lbs. Order now and SAVE! *Satisfaction guaranteed or money back.* We pay postage.

**$12.95** Post paid

**ROBERTS ELECTRIC CO., 849 W. Grand, Dept. 41, Chicago, Ill.**

---

**A "GOOD HAND" HELPS YOU SUCCEED!**

**LEARN TO WRITE WELL**

*Your Name* beautifully written, plus special pen-point for shaded writing, *Only 10¢*

**Handwriting quickly improves with our easy-to-understand picture lessons! Put your spare time to good use; send today for ☐ FREE BOOKLET, "How to Become a Good Penman," or check volumes wanted below at $1 each: ☐ Business Writing ☐ Artistic Writing ☐ Card Writing ☐ Bird & Design Flourishing ☐ Engrossing Alphabets. COMPLETE SET $4.50. Ask for price list of penman's supplies.**

OUR 53rd YEAR

**TAMBLYN SCHOOL of PENMANSHIP**

S. A. Ziller, Pres. 438 Ridge Bldg., Kansas City, Mo., USA

---

## SAVE AT LEAST 75%

**ON TAR ROOFING—Do it yourself! Does your home or garage need a new roof or repairs—if so do it yourself and save at least $200 (BASED ON 1000 SQ. FT.)—easily applied—no heat needed—anyone can do it. Send $1.00 for complete instructions and formula and self addressed envelope. Money back guarantee.**

Fred W. Krigin, Manager

**HEATLESS TAR & ROOFING CO.**

**4926 Concord Blvd. Concord, California**

---

## MAKE UP TO $5.00 AN HOUR WITH

## "DUPLISCALER"

FOR JEWELRY • PLASTICS (FORMERLY NAMED THE "PANTOGRAVER") FOR DISPLAYS • SCALE MODELS

**ELECTRIC MOTOR TOOL • PANTOGRAPH ATTACHMENT**

DO ENGRAVING & CARVING • ENLARGE OR REDUCE • SAMPLE ENGRAVING & DETAILS 25c DEDUCT WITH ORDER

**DESCO PRODUCTS DISTRIBUTORS** 6334-K SEPULVEDA BLVD. VAN NUYS, CALIFORNIA

---

## *Buy* DIAMONDS *at* Wholesale Prices

Benefit from Loan foreclosures and Estate liquidations. Values from $50 to $10.000.00. Write Dept B.

*Save* up to 50%

Write for FREE Catalog

**CITIZEN'S Diamond Brokers**

195 Mitchell St. Atlanta, Ga.

Est. 1914

---

# IMAGINE THEIR JOY

## *when they found they could play this easy-as-ABC way!*

**Learned Quickly at Home**

"I didn't dream I could actually learn to play without a teacher. Now, when I play for people they hardly believe that I learned to play so well in so short a time."
*H.C.S., Calif.

**Plays at Dances**

"Your lessons have been most satisfactory. I can play all of the popular songs. I have earned money playing at dances."
*E.N.J., New York

## What Instrument Would You Like to Play?

JUST name your instrument and we'll show you how you can learn to play it—quickly, easily, in spare time at home. Never mind if you don't know one note of music from another—don't worry about "special talent." And forget all you've ever heard about music being hard to learn.

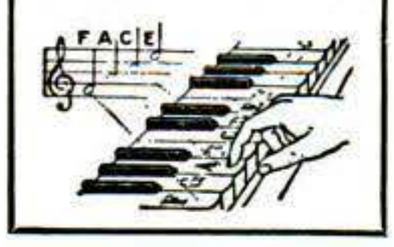
The truth of the matter is that *thousands now play who never thought they could!* Yes, men and women everywhere have discovered this amazingly easy way to learn music at home. Now they are enjoying the thrilling satisfaction of playing the piano, violin, guitar, saxophone or other favorite instruments. Some of them are playing in orchestras and over the radio; others are teaching music, making money in spare or full time. And thousands are having the time of their lives playing for their own enjoyment and the entertainment of their friends.

**Plays on Radio**

"I can't keep from telling you that I have a good position playing from KTHS, Hot Springs Ark., every morning." *J. S., Okla.

No tedious study and practice, no tiresome exercises. You learn to play *by playing*—start right in with the melody of a simple tune! It takes only a few minutes a day; the cost is trifling. Does it sound too good to be true? Mail the coupon and get the FREE PROOF!

**Easy as A-B-C**




**SEND FOR FREE PROOF**

Fascinating illustrated booklet answers all your questions; free Print and Picture Sample shows how method works. If interested, just mail coupon to U. S. School of Music, Studio B1512, Port Washington, N.Y. (900,000 Students—Our 55th Successful Year.)

**Actual pupils names on request. Pictures by professional models.*

**FREE! *Print and Picture Sample***

**U. S. School of Music, Studio B1512, Port Washington, N. Y.**

Send me Free Book and free Lesson-Sample. No salesman is to call upon me. I'm interested in playing (name instrument).....

☐ I do ☐ I do *not*—have instrument now.

Name.....
(please print)

Address.....



Copyrighted material

*Your Best* — **WATER & SHOCK RESISTANT**

*Watch Value is...*

# LIBERTY

**It's also Thinner, Smaller, Anti-magnetic, Strong and Handsome! A dependable "always on time" companion for work or play. Luminous Dial. Sweep second Hand. Unbreakable Crystal. Leather Strap. Additional Styles from $6.50 to $11.95. Glo-Gold Finish from $8.95 to $12.50.**

***At friendly stores most everywhere***

**LIBERTY WATCH CORP., NEW YORK 18, N. Y**

---

GET INTO

# SAW SHARPENING

**A BIG PROFIT "ONE-MAN BUSINESS"**

***Start Your Own PROFITABLE BUSINESS At Home Full-Spare Time. No Previous Experience Needed.*** **BIG PROFIT, repeat orders come from contractors, hardware stores, carpenters, cabinet shops, home owners, farms—mail orders too! L. Leclerc in New Hampshire says: "Sharpened 7 saws in one hour – made $7.00 cash!" FREE: Write now for BURR'S "Pay-as-you-Profit" Income Plan that shows you how to start small without overhead and grow to full-time saw repair shop with lifetime security. Send no money – just your name and address BURR MFG. CO., 8943-G Venice Blvd., Los Angeles 34, Calif.**

---

**DRIVING COMFORT at its best!**

***The New Electric Throttle***

**WITH FOOT CONTROL**

The Electric Throttle ("Speed-selector") sets whatever speed you choose electrically – releases instantly at a touch on the toe-button, or by applying foot brake. Banish foot and back strain for good! Price, $17.50 F. O. B. Check or C.O.D. Ten day money-back guarantee. Several State franchises open. Dealer inquiries invited. Give car, make, and year. Pays for itself in gasoline savings.

*An Ideal Gift Item*

**INSTALL IT YOURSELF**
**Send for FREE Illustrated Folder**

**D & M MFG. CORP. • Anderson, Indiana**

---

**U. S. GOV'T SURPLUS**

# "BARGAIN BOOK"

**SAVE ON WINTER NEEDS!**

It's loaded with bargains in genuine Gov't Surplus for farm-home-industry. Save up to 85% on clothing, hardware, sporting goods, etc. The "Book of the year". Send 10c for yours today.

**500 BARGAINS**
• FARMS • SPORTS
• HOME • SHOP

MAIL TODAY Only 10¢

**FISLER SALES CO.**
723 WALNUT ST., DESK S-12, KANSAS CITY, MO.

---

# *If* Ruptured

**TRY THIS!...**

If you can obtain relief by holding back your rupture or ruptures in this manner–**I CAN HELP YOU!**

Write today for my valuable FREE information which is based on 23 years of practical experience.

**FRED B. MILLER,** Mfgr.
Dept. P. Hagerstown, Maryland.

---

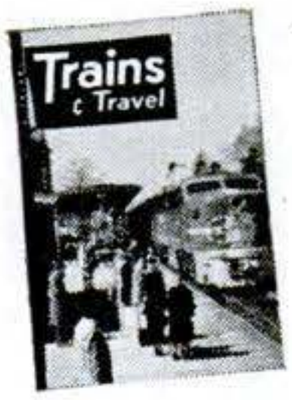
**WHAM-O SPORTSMAN** * $1.50 POSTPAID 35-LB. PULL!

HITS LIKE A RIFLE—
KILLS RABBITS, SQUIRRELS.
Powerful, silent, accurate.
For hunting, target, routing pests.
*Sportsman's choice sold world over!*

**HUNTING SLINGSHOT**

Heavy duty 7" ash stock.
40 steel balls, extra rubber, target.
GUARANTEED. At dealers, or send $1.50 to
**Wham-O Mfg. Co.** Box 8B, South Pasadena, Calif.
*** Professional model of Nat'l Slingshot Assn.**

---

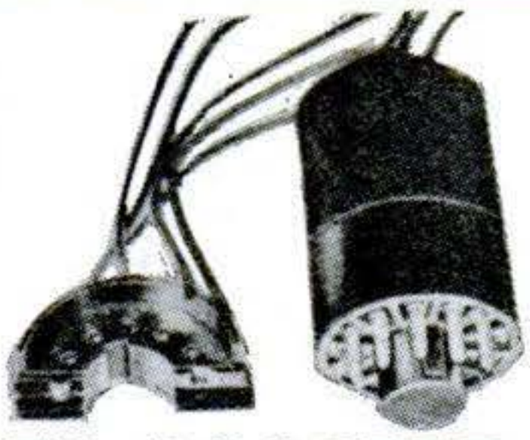



## Trains & Travel Magazine

Get this interesting and exciting picture-packed magazine. Read about fascinating places and railroads that reach them! 50c at larger stands. **Special Offer!** Send $1 for 3-month subscription. Act now!

**Trains & Travel Magazine Dept. 1672 A, Milwaukee 3, Wis.**

---



# SAVE $45.00 *on a new* PICTURE TUBE

**Don't spend $50.00 for a new television tube replacement!!!**

## TV BOOSTER—*ONLY* $5.00

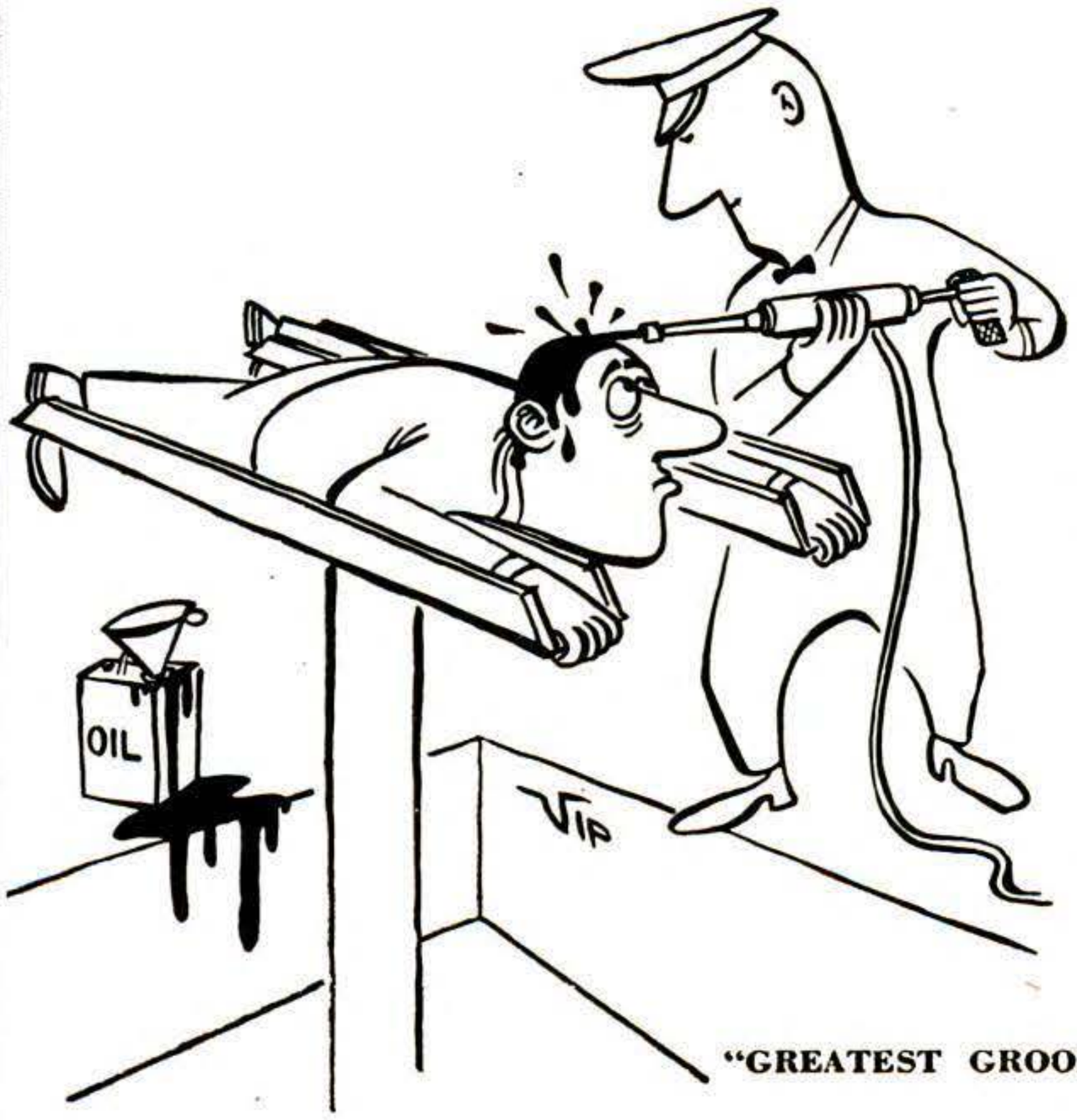
OUR TV-TUBE BRIGHTENER will bring back the original brilliance to your picture tube for any 10" to 21" set. RESULTS GUARANTEED or your money back. DON'T suffer from weak tube reception any longer. If your trouble is caused by a weak, dim picture tube then our booster will give you clear, bright pictures immediately. No tools needed to do this job in less than 5 minutes. You don't need to be a TV repairman to do this easy installation. Order the picture tube booster now at our amazing **low** price of $5.00 postpaid with remittance, or C.O.D.'s, send $1.00 and you pay postman $4.00 plus postage. Buy on our Satisfaction Guaranteed or **money refunded** basis.

**HUDSON RADIO, Box 6, W. Englewood, New Jersey**



Copyrighted material

# Vip's HAIR TYPES




***GREASE JOB.*** **Grease your car . . . *not your hair!* Give your hair IDEAL care. IDEAL'S new secret agent grooms without matting or gluing . . . makes thin hair look thicker, thick hair look *naturally* neat. Not an animal, vegetable or mineral oil. *You can't see it, feel it, smell it!* Put IDEAL on . . . it's gone! All that's left is all-day grooming.**

**Get New Fitch *Ideal* Hair Tonic**

**"GREATEST GROOMING DISCOVERY SINCE THE COMB"**

## FAIR AMERICAN
### REVOLUTIONARY WAR BRIG

A new large kit (26½" overall) of the famous vessel, plans by John Stevens. Complete kit with machine carved hardwood hull, special castings, brass, blocks, cordage for complete model . . . . . **$24.50**
*See it at your dealer's. Send 25c for our new 1953 catalog illustrating 16 model kits and numerous fittings.*
If you like frigates, don't miss our new ESSEX, ⅛" scale, 4 sheets of authentic plans. Complete kit, $32.00. Comparison will open your eyes!

**MODEL SHIPWAYS, Folio W**
**476 MAIN ST. FORT LEE, N. J.**

## STUDY AT HOME LAW FREE BOOK!

### *Prepare for the Bar!*

Write today for a copy of our FREE book, **"The Law-Trained Man,"** which gives the bar rules in your state and tells how ambitious men and women since 1890 have been preparing at home in spare time for the practice of law by studying the famous Blackstone bar-training course. All needed instruction material is furnished including big 16-volume law library. Law diploma awarded. Moderate tuition; easy monthly terms. Write for FREE book today!

**BLACKSTONE SCHOOL OF LAW**
**225 N. Michigan Ave., Dept. 129, Chicago 1, Illinois**

## Get into.. PLASTIC LAMINATING AT HOME!

**THIS MAN . .**
. . . is taking out of the machine a Plastic Sealing Job — ordered by mail — only 11c in material cost brings back $2.58 in cash by mail. Capacity of machine: **$25.00 profit per hour of operation.**

**Get ORDERS and CASH from your mailman—do work in SPARE TIME at home —or expand into FULL TIME business.**
Send coupon for Free facts about the newest and most fascinating of all home operated businesses. For the first time a simplified machine brings the fabulous profits of **Plastic Sealing** and **Plastic Laminating** within the reach of the small operator. Anyone can learn to operate the machine with a few minutes practice—then with our **Magic Mail Plan** can get mail orders pouring in daily with cash in every envelope. ***No canvassing—no selling.*** We even supply the circulars you mail to bring back cash and orders. Don't waste a minute. Rush your name. We'll send you FREE and postpaid, pictures, prices, details, and all the facts you need to start. Mail coupon or send name on postcard. No charge.

**Make $20 to $30 a Day by.. MAGIC MAIL PLAN!**

**Warner Electric Co., 1512 Jarvis Av., Dept. L-9-W, Chicago 26, Ill.**

**Make Thousands of Beautiful Art Creations**
**COSTUME JEWELRY • CIGARETTE BOXES TRAYS • CANDLESTICKS • COASTERS LAMP BASES • BOOK ENDS...ALL IN SPARKLING COLORED PLASTIC**

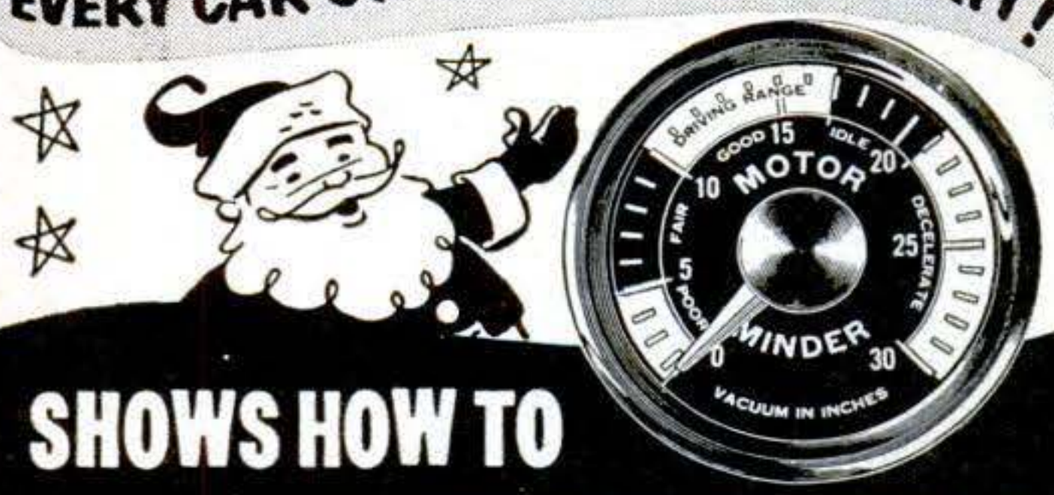
**WARNER ELECTRIC CO., 1512 Jarvis Av.**
**Dept.L-9-W, Chicago 26, Ill.**
At no cost to me, please rush complete details postage prepaid. I am under no obligation.

*Name*_____
*Address*_____
*City*_____ *Zone*____ *State*_____



Copyrighted material

EVERY CAR OWNER WANTS THIS GIFT!




SHOWS HOW TO SAVE GAS·CUT REPAIR BILLS

Stewart-Warner®

MOTOR MINDER

**Reports Engine Performance Spots Trouble While You Drive**

You'll know at a glance how your engine performs! See how to increase mileage, avoid repairs and *save!* With the accuracy of a mechanic, MOTOR MINDER gives a constant visual check of engine performance—spark plugs, valves, carburetor, timing, piston rings, manifold and muffler. MOTOR MINDER warns of trouble coming—on clearly marked, illuminated dial. Easily, quickly installed.

**Only $10.95 . . . Pays for Itself**

At Your Dealer, or Write:

STEWART-WARNER

Instrument Division, Dept. P-122
1840 Diversey Parkway, Chicago 14, Illinois

MAKE BIG MONEY!

Be a floor surfacing contractor and sand both new and old floors. Sanders are easy to operate and better still, you're your own boss. Write for latest "tell-all" booklet entitled "Opportunities In Floor Surfacing" enclosing 25 cents in coin or stamps to cover handling.

AMERICAN
FLOOR SURFACING MACHINE CO.
532 So. St. Clair Street • Toledo 3, Ohio

C1 COLORCRETE

Drab or dirty masonry—concrete, stucco, etc., becomes gleaming white. Or there's a range of sparkling colors — ivory, cream, pink, blue, green, and 25 more. Colorcrete is fused to masonry surfaces under pneumatic pressure. Stays put and stays beautiful. Highly water resistant. Used for more than a quarter century.

There's Profit-Appeal in Stucco Spraying

The business of applying Colorcrete is a community enterprise, with special appeal to men of limited capital. Equipment is compact, simple to operate, practically wear-proof. Work is easy, interesting and rich in profit potentials. Broad opportunities for development. We supply all equipment and full instructions.

No experience or special ability needed. Write or wire today for the Opportunity Book.

COLORCRETE INDUSTRIES, INC.
572 Ottawa Ave.
Holland, Mich.

THE NEW DART RULE

with "clear vision" design
the perfect gift

| 6 ft. | 8 ft. | 10 ft. |
|---|---|---|
| $1.25 | $1.50 | $1.75 |

DART MFG. CO. MASON, MICHIGAN

OIL FROM THE PUBLIC LANDS

Get the amazing story of how U. S. citizens can file for oil rights on public land in the West. Profits made as high as $250,000 for $250; $11,000 monthly for $200. We select lands in possible oil areas, show you how to file. Send for free booklet.

CALIFORNIA LEASE CO.

7075-PS Hollywood Blvd., Los Angeles 28, Calif.

ILLUSTRATED CARTOON BOOKLETS!

SAY FELLOWS! BE THE LIFE OF THE PARTY WITH THESE SMALL ILLUSTRATED CARTOON BOOKLETS OF COMIC CHARACTERS!

10, ALL DIFFERENT, $1 POSTPAID

SORRY— NO POSTAL C.O.D.'S!

REGINALD SALES

210 L Fifth Ave., New York, N. Y.

Free Book on Arthritis And Rheumatism

HOW TO AVOID CRIPPLING DEFORMITIES

Explains why drugs and medicines give only temporary relief and fail to remove the causes; tells all about a specialized non-surgical, non-medical treatment which has proven successful for the past 33 years. Write for this 44-page FREE BOOK today.

Ball Clinic Dept. 36 Excelsior Springs, Mo.

NEW AUTOMATIC DEFROSTER

ONLY $7.95

YOU MAKE UP TO $4 ON EVERY FAST SALE!

Millions of defroster attachments sold at $12.50. Now—with new guaranteed HOLWIN at $7.95, sales breaking all records. Men selling as many as 10 and 12 a day—right now. Your profits big—as high as $4.00 cash on every sale. Converts any old style refrigerator into automatic defroster in 10 seconds. Just plug in. Terrific demonstrator. Women crazy for it at this price. Sell 4 out of 5 calls.

NO CHARGE for complete selling kit and offer of sample demonstrator. Rush name. If you've ever sold anything you'll clean up with HOLWIN. All mailed Free. Send name today for $140-a-week opportunity and offer of demonstrator.

DEFROSTER SALES CO., 415 LaSalle St., Dept. H-9-W Chicago 10, Ill.

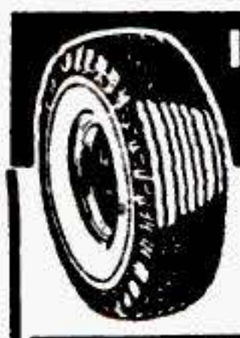
FREE

SEND NAME

Rush name for free sales kit and offer of demonstrator sample. Sales skyrocketing. Send name. Get in on big money.




Copyrighted material



## INSURED TIRE SERVICE
## POPULAR BRANDS

SPECIAL! Deduct 10% on orders for Two or More used tires

**FREE** INSURANCE POLICY given with each used tire sold. We guarantee the amount of service you pay for.
Tube Given Free with Each Used Passenger Tire Upon Request

**YOU CAN'T LOSE!!**

**Super Quality — Rugged Performance — 15 Months Insured Service**

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 600x16 | $4.55 | 670x15 | $5.25 | 700x16 | $5.55 | 760x16 | $6.35 |
| 650x15 | 4.95 | 670x16 | 5.35 | 710x15 | 5.45 | 820x15 | 6.45 |
| 650x16 | 5.45 | 700x15 | 5.40 | 760x15 | 5.95 | 550x17 | 4.75 |

**Supreme Quality. Nothing Finer — 30 Months Insured Service**

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 450x20 | 5.95 | 450x21 | 6.25 | 700x15(6) | 10.45 | 750x16(8) | 15.95 |
| 600x16 | 5.65 | 650x15 | 5.75 | 600x20 | 10.95 | 900x20 | 19.95 |
| 650x16 | 5.85 | 670x15 | 5.95 | 650x20 | 11.75 | 1000x20 | 20.45 |
| 700x16 | 7.75 | 700x15 | 5.75 | 700x20 | 12.50 | 1100x20 | 26.75 |
| 750x16 | 12.50 | 710x15 | 6.50 | 32x6(8) | 11.95 | 1000x22 | 19.50 |
| 550x17 | 5.75 | 760x15 | 6.95 | 32x6(10) | 12.75 | 1100x22 | 24.75 |
| 525x18 | 5.45 | 820x15 | 7.50 | 750x20 | 14.50 | 1200x20 | 23.50 |
| 640x15 | 5.75 | 475x19 | 5.75 | 825x20 | 21.50 | 1100x24 | 22.75 |

**SNOW TIRES**
NO CHAIN PROBLEMS
"Worry-Proof" Driving

| | | | |
|---|---|---|---|
| 600x16 | 10.95 | 670x16 | 11.75 |
| 600x15 | 11.45 | 700x15 | 13.95 |
| 640x15 | 11.45 | 700x16 | 14.95 |
| 650x15 | 11.95 | 710x15 | 13.95 |
| 650x16 | 11.95 | 760x15 | 14.95 |
| 670x15 | 11.95 | 820x15 | 15.95 |

NEW TIRE GUARANTEE

**MIDLAND TIRE SALES**
1141 W. Randolph St., Dept. SS-2, Chicago 7, Ill.
Speedy shipments on Mail Orders. Insurance Policy sent with each order. Deduct 10% on orders for 2 or more used tires. Send CHECK MONEY ORDER. No C.O.D.'s.

## GROW MINIATURE TREES
FOR PROFIT & PLEASURE

New! Amazing! Living Miniature Trees only 12" tall. Chinese Ming, Japanese Elm, Tiny fruit trees that actually bloom andbear. Grow from seed at home for fun or Big Profit business. Make gorgeous home decorations worth many dollars, yet cost but pennies to grow. Fascinating, artistic hobby. Secret Oriental plan details, FREE.
MINIATURES, 1020 Richman, Fullerton, Cal

## V-PLEX AUTOMATIC CLUTCHES

Get *smooth* pickup for your power mower, motor scooter or garden tractor . . . with only throttle control. Prevent stalling engine, cut belt wear, permit no-load idling. Easily installed on ½, ⅝, ¾" gas engine shafts. Factory-tested. See dealer or write for folder. PS 12

V-PLEX CLUTCH DIVISION — Hagerstown, Indiana

## SHIP MODEL KITS

Largest supply in New England. Fittings — Blueprints — Books. All prices. Write Dept. PS53. BIG ILLUSTRATED CATALOG ..... 25c
JAMES BLISS & CO., INC.
121 Years in Business 342 Atlantic Ave., Boston 10, Mass.

## ENDS FRONT WHEEL DRAG ON 4-WHEEL DRIVE JEEPS

**Willys $20.00**
**Dodge $23.00**
Pair, Prepaid U.S., Canada

**MAKES 2 JEEPS OUT OF 1!**
Cut repair bills! Double the usefulness of your Jeep! Enjoy snappier performance! Install Warn Hub Caps on your 4-wheel drive Willys Jeep, Station Wagon or pick-up; or Dodge Army ¾ ton or Power Wagon—get more power, speed, pick up. Warn caps eliminate heavy drag of complex front end drive assembly, front wheels coast out of gear on roller bearings—4-wheel handles, performs like 2-wheel. Warn Caps increase gas mileage up to six miles per gallon, stop shimmy even though gears are worn, add thousands of miles to tire life. No interference with low power range or 8 speeds. Easy to install or remove in 10 minutes. No special tools required. Thousands of satisfied owners. Polished aluminum, last for years. Guaranteed. Rush check, M.O., C.O.D. or write for literature.

**WARN MFG. CO., P. O. Box 6064 - B2, Seattle 88, Wash.**

MEN—WOMEN!

# Paint it with Suede

## SPRAY ON RAINBOW COLORS
## for PROFIT and Pleasure..

FLOK KRAFT

*Flok-Kraft Covers: Plaster, Fabric, Wood, Metal, Plastic, Rubber - any surface!*

A *SENSATIONAL* NEW HOME BUSINESS!
A NEW INDUSTRY...
A NEW MIRACLE FINISH!!
MAKE $5.00 to $10.00 PER HOUR *and more!*

### *Read* What Others Say About Flok-Kraft

". . . pleased with your course and I'm being swamped with work to do." W.F., Pa.

"Got $52.50 for those 7 trunk interiors for about 4 hours work. $7.50 per trunk." J.O., Mo.

"Received the flok-kraft outfit and everyone that saw it is very enthused. I only had it about thirty minutes and got an order for a hundred dollar job." Mr. C. H. Maryland.

**YOURS TO EXAMINE WITHOUT RISK!!**
Complete instructions, starting kit of materials, equipment-complete, full details on how you can start your own business, spare or full time—EVERYTHING sent you to EXAMINE AT OUR RISK!

**FLOK-KRAFT and DEFENSE**
Flok-Kraft offers a way to big, extra money, assisting defense manufacturers in many lines as well as filling a big demand on the home front.

**PROFESSIONAL SECRETS CAN BE YOURS**
At last, secrets of this amazing miracle finish can be yours! Huge profits waiting to be tapped in tremendous new field. Flok-Kraft gives a velvety, luxurious surface to radios, lamps, toys, signs, store displays, figurines, auto dash boards—a thousand and one items to be seen on every hand easily and quickly beautified, enriched, increased in value with Flok-Kraft. Make old objects beautiful—saleable, make new things worth much more with this soft, rich covering that can be applied to any surface, even if old or worn.

**YOU CAN LEARN IN A FEW DAYS**
Make to $5.00—yes! even $10.00 and more per hour. Fully detailed Flok-Kraft instructions—complete and easy to understand—every point explained — shows you how to start on the road to big money, full or spare time.

**WE FURNISH EVERYTHING YOU NEED TO START**
You also get complete Flok-Kraft kit of materials and equipment that enables you to start at once. Add to your income from your regular job or begin to build a successful business of your own and do it all, right in a corner of your basement, garage, service porch, kitchen or living-room.

**GRASP THIS LIFETIME OPPORTUNITY TODAY**
I'll arrange to send you the complete outfit—everything you need to start—for leisurely, no-risk examination right in your own home. You owe it to yourself to investigate. Fill out and mail the coupon below for FREE details, Sample, Plan, etc. Do it today! Everything I send you now is FREE of charge and postpaid. Airmail is faster.

COAST INDUSTRIES, Dept. 1C
1004 S. Los Angeles St.
Los Angeles 15, Calif.

SEND NO MONEY! JUST YOUR NAME AND ADDRESS

NELS IRWIN
Director of Instruction

FREE! Booklet, Sample, Plan!

COAST INDUSTRIES, Dept. 1C
1004 S. Los Angeles St., Los Angeles 15, California
Gentlemen: Please rush me FREE details, sample, etc., I understand that everything you send is free and that I'll be under no obligation now or ever.
NAME
STREET
CITY
STATE

# We teach you FREE!

## We put you in Business!

HERE'S THE BIG OPPORTUNITY FOR YOU! Learn a new and fascinating occupation . . . a wonderful hobby . . . and MAKE MONEY AT THE SAME TIME! OPERATE AT HOME OR IN A SMALL SHOP! AND . . . the complete Instructions . . . books, lessons and personal guidance COST YOU NOTHING! We teach you FREE how to make the most beautiful jewelry you have ever seen: door-knobs imbedded with interesting objects, nite-lites, book-ends, coasters, name-plates, ash trays, paper weights, statues, figurines, souvenirs, novelties, gadgets, etc. . . . an endless variety of high-quality, highly saleable products out of LIQUID MARBLE, TRANSPARENT GEM-LIKE LIQUID PLASTIC, CERAMICS, PLASTER, COMPOSITIONS, STONE, ETC! All without tools or machinery! The manufacture of these lovely objects is as easy as pouring water out of a glass! And—you learn how ABSOLUTELY FREE! The only limitation is your own IMAGINATION! No special talents or experience are required!

You get more than the FREE INSTRUCTIONS! We also show you methods of *selling your finished work* . . . even selling part of it to us! Start on a shoestring! And overnite, become established in one of the most fascinating and profitable occupations in existence.

Just send 25c for our big catalog, "CASTING MATERIALS, MOLDS, ETC."—and you're on your way! Along with the catalog we will include the book, "THE ART and BUSINESS OF CASTING" absolutely FREE! And—surprising details on an amazing, exclusive Plasticast offer guaranteeing your success! DON'T DELAY! This could be the most important step of your lifetime! WRITE TODAY!

**PLASTICAST CO. (Dept. A)**

**P.O. Box 6737** Chicago 80, Ill. *(Write to nearest address)* **P.O. Box 987** Palo Alto, Calif.

**CANADIAN CUSTOMERS:** Send 35c for catalog to Canadian Ind. PLASTICS, 1056½ W. Pender St., Vancouver, B.C.

---

# FREE 226 STAMPS

***Including Famous Berlin Bear Stamp***—used by Russians as propaganda to show "The Bear" rebuilding Berlin. We'll also include 225 other stamps—all DIFFERENT—ALL FREE—to introduce our special bargain approvals. PLUS a FREE copy of our helpful, informative book, "How to Collect Stamps." Rush name, address, and 10c to help cover postage and handling to:

**LITTLETON STAMP CO., Dept. PO-12, Littleton, N.H.**

---

# ENGINEERING DEGREE IN 27 MONTHS

## *Big Demand for Graduates*

**AERONAUTICAL, CHEMICAL, CIVIL, ELECTRICAL, MECHANICAL and RADIO ENGINEERING (inc. TV and Electronics).**

Hundreds of young men are earning **B.S. ENGINEERING DEGREES** annually in this recognized institution—year around operation. New terms start quarterly. Many students earn a major part of their college expenses in this large industrial center.

Low tuition. Competent instruction. Thorough, intense, practical program. Modern, well-equipped laboratories including new physics laboratory and modern wind tunnel. Individualized instruction emphasized.

Gov't approved for G.I.'s. Engineering preparatory courses. Students from 48 states and 21 foreign countries. Enter December, March, June, September. Send coupon for free catalog and full information. Enroll now.

**SEND COUPON TODAY**

**INDIANA TECHNICAL COLLEGE**
**6122 E. Washington Boulevard**
**Fort Wayne 2, Indiana**

**Please send me free information on B. S. Engineering degree in 27 months as checked.**

☐ Aeronautical, ☐ Chemical, ☐ Civil,
☐ Electrical, ☐ Mechanical, ☐ Radio-Television.

Name.....

Address.....

---

# WAR SURPLUS BARGAINS

**$500,000.00 INVENTORY for QUICK LIQUIDATION**

Surplus items—hundreds of them for home, shop, factory, farm and outdoor use. New items, used items, reconditioned items—all at tremendous savings—all priced for quick sale.

**PAGE AFTER PAGE OF VALUES**

This big catalog shows page after page of amazing money saving values. Write for your copy today. Send 10c to cover postage, mailing, etc. Write today!

**10c**

**SEND TODAY FOR YOUR COPY**

**STARK'S**

**509 So. State St.**
**Dept. PS-1252**
**CHICAGO 5, ILL.**

---

# PUMP WATER *FAST!*

**DRAIN WASH TUBS, CELLARS, CISTERNS**
**IRRIGATE—FILL TANKS—DRAW WELL WATER**

Pumps 2800 GPH. 420 GPH at 75' High or 1600 GPH from 25' well. Sturdy, Rustproof Alloy Metal. Six Blade Impeller. Uses any 1/8 to 1/2 H.P Motor Will not leak or clog. Fits any garden hose. Immediate Money Back Guarantee. Send Check, M.O., or C.O.D. **8.95** IN U.S.

**MOORE MANUFACTURING CO.**
SWEDESBORO 2 NEW JERSEY

---

# 2-BEDROOM HOME $890

**BUILD YOUR OWN**

Living room 12x14. Master bedroom 10x12. Nursery-den 10x11. Kitchen 7x10. Bath 5x8. Concrete block built. Blue prints, material lists, exact instructions for 3 designs.

Complete $1 ppd.

**SUNNY-CAL HOMES, Box 309-E, Hollywood 28, Calif.**

---

# RUPTURE-EASER

*Reg. U. S. Pat. Off.* **FOR MEN, WOMEN AND CHILDREN**

**A strong, form fitting, washable support. Back lacing adjustable. Snaps up in front. Adjustable leg strap. Soft, flat groin pad. No steel or leather bands. Unexcelled for comfort. Also used as after-operation support. Give measure around the lowest part of the abdomen. State right or left side or double. We pay postage except on COD's. PIPER BRACE CO.**

Pat. No. 2606551

Right or Left Side **$3.95**

**Double 4.95**

811 Wyandotte Dept. PS-122 Kansas City 6, Mo.

---

*Take it easy with this...* **2 H.P. SNOW BLOWER**

**Powerful! Adjusts to dry or wet snow!**

**one of 15 attachments available with**

**GEORGE**

**LAWN & GARDEN TRACTOR**

TRACTOR ONLY WITH 2 H.P. ENGINE **$119.50**

SNOW BLOWER **$29.50**

14 OTHER TOOLS $4.50 to $42.50

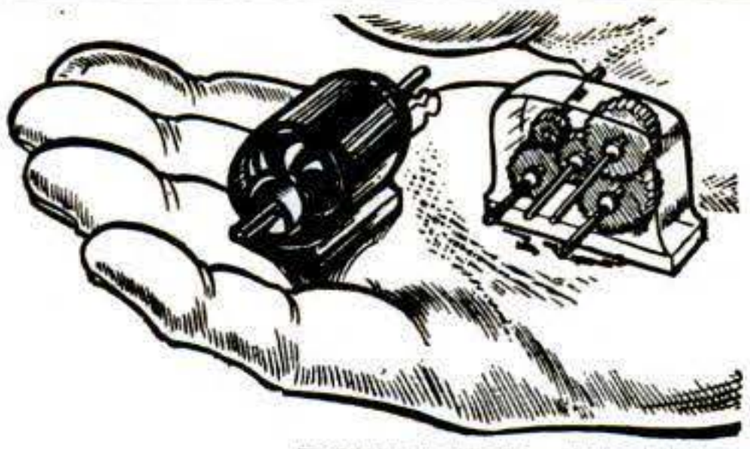
F.O.B. SULLIVAN

**Health Saver, Money Saver, 12 months a year! Fully guaranteed! Compare with others at $50 to $75 more. Write for folder 35.**

**GEORGE GARDEN TOOL DIV.**
Community Industries Assn.
**Sullivan • Illinois**



Copyrighted material



**COMPLETE MOTOR & GEAR KIT HOUSING BATTERIES CLIPS**

**only $2.98**

## POWERFUL MOTOR:

One of the smallest precision motors ever built yet does GIANT-SIZED JOBS. Drives Model Planes, Boats, Construction Sets, Working Models, Trains and Cars, etc., with amazing speed up to 6800 R.P.M. (or as little as 50 R.P.M. using the reduction gears that come with this exciting set. This MIGHTY-MIDGET does hundreds of jobs. It's a Honey! Looks exactly like a Big Motor yet measures 1"x1¼" and weighs one ounce. For only $2.98 YOU GET LOTS MORE with this Mighty Midget. You get a complete set of gears and pulleys and a transparent multi-ratio gear box as well as a battery clip with two batteries and instructions. NO SHOCKS, SPARKS OR SHORTS. NO TRANSFORMER NEEDED. Reverses immediately too! Endless hours of fun. Enclose check or money order for $2.98 for this entire set and we will pay postage. C.O.D. orders plus postage.

**IMPERIAL SALES CO.**
**480 Lexington Ave., Dept. M-668 New York 17, N. Y.**

---

***CUT BUILDING COSTS ⅔!***

## Make Your Own Concrete BLOCKS and BRICKS To Use or Sell

New superior moulds make absolutely square, true, easy-to-lay blocks which will pass any building code. Production is fast . . . easy. One durable $30 machine will make four 5"x8"x12" blocks per minute—1,000 a day. Pays for itself in one day! Sell blocks for big profit . . . or save ⅔ building cost for yourself. POST CARD BRINGS FREE FOLDER.

**ECONOMY MFG. CO.**
**DEPT. S STONE MOUNTAIN, GA.**

---

## Secrets of VENTRILOQUISM Now Revealed!

Easy to learn in 60 to 90 days with our Home Study Course. **RESULTS GUARANTEED.** Make Money! Be Popular! Have Fun! Big Opportunity! Radio, Television, Stage Appearances! For Free Information regarding price and terms, WRITE. You must state your age. Dummy Catalog 25c.

**FRED MAHER SCHOOL OF VENTRILOQUISM**
**Box 36, Studio 12 Kensington Station**
**Detroit 24, Michigan**

---

## Quick, EASY Way to REPRODUCE any Object

Make exact duplicates of trays, lamp bases, medals, figurines, vases, etc. right at home overnight! New RUBBER MOLD method needs no heat-curing. No special skill or tools required. Make perfect reproductions of objects of clay, plasteline, wood, metal, glass in any quantity! Cost will be only few cents. Send for Brochure 52 which gives exact step-by-step instructions anyone can understand and follow. Send 10c for it today to

**SCULPTURE HOUSE, 304 West 42nd Street, New York 36, N. Y.**

---

## $199 STARTS YOUR OWN BUSINESS WITH A Jetspray VENETIAN BLIND LAUNDRY

**1,000 LBS. FREE DETERGENT! !**
**MAKE UP TO $75.00 A DAY**
**In This New Fast Growing Industry**

Use latest lowest priced professional unit engineered by inventor, world's largest manufacturer of venetian blind cleaning equipment. Beware of imitations.

JETSPRAY is incomparable—re-uses detergent. Cleans quickly without rubbing or taking blind apart. Homes, factories, etc., want this fast low cost service. Start in basement or garage—expand as business grows.

**BIG PROFITS - - - UNLIMITED OPPORTUNITIES**
**NO EXPERIENCE NECESSARY - WE SHOW YOU**
**Write today—learn how you can be independent in your own business.**

**L. C. ROBINSON MFG. CO.**
**522 N. Rural St. Dept. P12 Indianapolis 1, Indiana**

---

# CHRISTMAS GIFTS

*UNITED "Seal of Quality" etched only into UNITED'S "Best-By-Test" UNI-COATED* Binoculars. Your guarantee of satisfaction.* **Insist on it!**

UNITED Bargain offerings are all **BRAND NEW** top quality UNI-COATED* Binoculars with precision ground optics, lightweight metal bodies. Achromatic and Moisture-Dust proofed!

**16x50** (illustrated) is the ultimate in a fine precision made binocular. Tremendous power—yet Easy to hold, Easy to focus for it weighs only 27 oz! Objective lens is 50mm (2" across)!

## UNITED'S CHRISTMAS SPECIALS

**6x** 4½ oz. Pocket size (3" long) now.....**$16.95**
**6x30** 15 oz. Economy priced 4½"x6"..... **27.95**
**7x** All chrome, palm sized masterpiece..... **19.95**
**7x35** Sturdy – all round use 5"x6½"..... **45.50**
**7x35** CENTER FOCUS. Great performer..... **49.50**
**7x35** German 14 ounces! CENTER FOCUS..... **57.50**
**7x40** CENTER FOCUS. A great value..... **52.50**
**7x50** "Day and Night" glass. 31 oz.!..... **36.00**
**7x50** CENTER FOCUS. 6¾"x7¼"! ..... **39.50**
**8x30** An all purpose glass. 18 oz.! ..... **32.50**
**8x30** German **World's Lightest** (11 oz.)! CEN. FOC. **39.50**
**8x40** MORE POWER Yet only 5½"x6¾"..... **54.50**
**8x40** CENTER FOCUS Perfect balance ..... **62.50**
**10x** Pocket Model weighs only 7½ oz! ..... **24.95**
**10x30** Compact Power for it weighs only 18½ oz... **39.50**
**10x50** CENTER FOCUS Superb 27 oz. ..... **59.50**
**12x50** CENTER FOCUS Tremendous power (27 oz.) **67.50**
**20x56 German** 9½"x6"! Weighs 27 oz.! CENTER FOCUS **99.50**
**15x-40x American** Wollensak 6 in 1 Telescope. COATED! 9" closed 27" extended. 18 oz.! NO FED. TAX..... **30.75**

## 20 POWER

A 20 power UNI-COATED* telescope. Easy to hold and focus for it weighs only 7½ ounces. Pocket size (8⅜" closed, 13½" extended). Threaded fittings throughout! **All Metal.** Achromatic. Ideal for accurate range checking, nearby or distant viewing, etc. Federal Tax Free!..... **$8.95**

**UNI-COATED*** Assuring buyers that applications of magnesium fluoride have been applied to the interior sides of the **VITAL** front and rear **ACHROMATICS** assuring users brighter, clearer, sharper images than ever before.

**FROM 3 CONTINENTS** come **UNITED'S "BEST-BY-TEST"** binoculars. Above are from America, Germany, and where not indicated, from American influenced Japan where skilled German optical craftsmen tutored local optical workmen in advanced techniques. It explains why the quality is so **HIGH** and the price so **LOW.**

**30 DAY FREE TRIAL**—If not fully satisfied, return for full refund. Cash orders postpaid. C.O.D.'s require $2.00 deposit. Add Federal Tax. Prices all include handsome genuine leather case and straps!

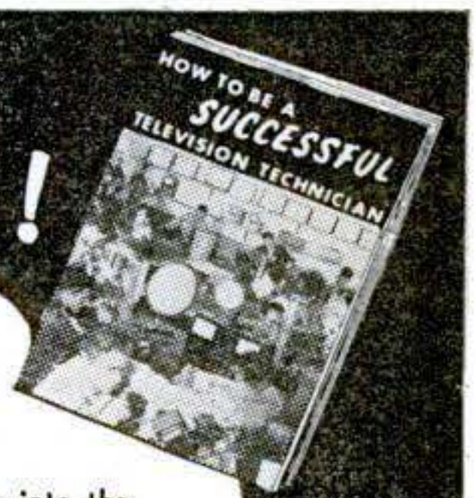
**FREE** 3 color 40 page catalog listing over 60 different models, UNITED, Zeiss, Hensoldt, etc. from $14.95

**AIR MAIL** For speedier Christmas delivery Add $1.00 for pocket size binoculars and 20x Telescope; $2.00 for 6x, 8x, and 15x-40x Telescope; $3.00 all others.

**UNITED BINOCULAR CO., United Bldg., 9043 S. Western Ave.**
**Dept. ARF-7716 CHICAGO 20 DEALERS WANTED**
Display Sales Rooms open Mon.-Fri. 9:00-3:30

---

## BE A WELL-PAID Television SERVICE TECHNICIAN!




**NOW—For the First Time An Exclusive TV Service Training Program—8 months or less.**

Get the inside facts on how you can step into the top professional $5,000 to $10,000 per year bracket of TV servicing. Free book tells you how. Master TV servicing QUICKLY by working on real live equipment right in our BIG SHOPS and LABORATORIES in America's Leading TV Servicing School. Shop trained men get the better jobs. WTI graduates win faster promotion . . . can demand better pay . . . develop highly profitable businesses of their own—with the latest and most complete PRACTICAL PERSONALIZED TRAINING BEHIND THEM. Non-essential math and engineering theory omitted. YOU CAN EARN WHILE YOU LEARN. LOW TUITION PLAN. Approved for Veterans. WTI Graduates In Big Demand. Send for your copy of this fact-packed book NOW!

**SEND FOR FREE COPY TODAY!**

Western Television Institute Dept. M-12
341 W. 18th St., Los Angeles 15, Calif.
Without obligation, please send FREE fully illustrated booklet. (No salesman will call.)

NAME_____

ADDRESS_____



Copyrighted material

# ARCADIA ELECTRIC POCKET *Viewers*

**FOR 2x2 SLIDES BANTAM & STRIP FILM**

**POWERED BY STANDARD FLASH-LIGHT BATTERIES**

**DELUXE MODEL**

**$5.95**

**STANDARD MODEL**

**$4.95**

**FOLDS TO FIT POCKET OR PURSE**

• IF YOUR DEALER CAN'T SUPPLY YOU WRITE DIRECT—

**ARCADIA MANUFACTURING CO.**
2646 WEST NORTH AVENUE
CHICAGO, ILLINOIS

---

# *Wood Carving* AND *Whittling*

**AN ARTISTIC HOBBY FOR ALL**

This new manual shows you how to do every kind of wood carving. How to carve jewel boxes, picture frames, trays, chests, furniture, etc. How to do chip carving, level surface carving, incising, carving in relief. Carving human and animal figures in the round completely explained and simplified. 256 Pages. Fully illustrated,—full cloth bound. Send only $2.00 and your copy will be sent postpaid, or order COD plus postage if you wish. *Money back if not satisfied.*

***Popular Science Monthly***

353 - 4th Ave. Dept. 1252 New York 10, N. Y.

---

# CAR OWNERS!

## First 12 Pages Alone of New Auto Book Can SAVE You Over $86.00!

**Popular Science Experts Help Keep Your Car's Value Up — Repair Costs Down!**

Now ready! "HOW TO TAKE CARE OF YOUR CAR"—big, new "show-how" manual that helps you save hundreds of dollars repairing your own car regardless of make or model! Simple "do-it-yourself" instructions help you prevent 95% of costly car break-downs! Make many necessary repairs and adjustments *at no cost* or for just a few pennies! Save on gas, oil, tires, paint jobs, motor and body repairs—everything fully illustrated in 5 colors!

**SAVE** hundreds improving your car's performance and appearance, modernizing your garage, and making scores of other improvements!

**EXTRA!** Save untold troubles and disappointments when buying a used car. Buyer's Guide on Pp. 168-172 makes it practically impossible to get stuck with a "lemon."

**256 BIG PAGES!**
**750 PICTURES!**
**851 NEW IDEAS!**

**ONLY $2.49**

**SEND NO MONEY! All you do is merely detach Coupon below and mail in now. Enjoy week's FREE trial! Balance of edition going fast; we may never again be able to offer book at low bargain price of $2.49! Paste Coupon to 2-cent postcard—mail *TODAY!***

POPULAR SCIENCE, DEPT. 1252
353 Fourth Ave., N. Y. 10, N. Y.
Please send "HOW TO TAKE CARE OF YOUR CAR" in edition checked below. I will pay postman $2.49 plus postal fees. If not satisfied, I may return book within 7 days for refund of purchase price.

☐ De Luxe Edition only 50c extra.

Name.....

Address.....

City.....Zone.....State.....

☐ Check here if you remit now. We will pay all shipping costs. Same return privilege.



Copyrighted material

**FUN TO ASSEMBLE FROM KIT**

More than 32,000 in use. Kit includes pre-cut marine plywood and wood parts, brass screws, seam compound, full instructions. A rugged boat, easy to assemble. Free booklet.

**Sea Shells of Branford**
**6270 N. Main St., Branford, Conn.**

**French STYLE DUELING SWORDS** SET OF TWO **$3.98** post paid

Once used in deadly combat—now an exciting sport! Learn right at home. Fun—safe*—educational. These swords are made of fine blue spring steel, polished metal guards, turned handles, rubber safety tips. Fencing teaches quick thinking, develops coordination, posture. Since the Middle Ages, Europeans have enjoyed the sport of dueling. *Now advocated by U.S. colleges. Set includes two swords and the booklet, "The Art of Fencing". Special price. **MONEY BACK IF NOT COMPLETELY SATISFIED**

At sporting goods dealers or send $3.98 to
TECHRITE CORP., Box 12 T South Pasadena, Calif

**LEARN MODERN WATCH AND CLOCK REPAIRING**

***Complete Course—Only $5.95***

**At home, spare time.** Good field now . . . security and contentment in future. Start part-time business and **EARN while you learn.** Horology is precision instrument work...a great and growing field, sensational opportunities. Easy self-instruction course. Full price, only $5.95. SEND NO MONEY. Just pay postman, plus C.O.D. postage. Or send $5.95 with order, we'll ship postpaid. Satisfaction guaranteed or refund. **NELSON-HALL CO., 210 S. Clinton St., Dept. 3MY-1, Chicago 6, Ill.**

**FIXIT-FLASH**

**NEW! EXCLUSIVE! PATENTED!** Test fuses, lamp bulbs, plugs, switches, condensers, radio and TV tube filaments—Locate shorts, grounds, open circuits, etc.

**TWO FINE INSTRUMENTS IN ONE!**

A rugged, quality flashlight and versatile continuity tester—for handy-men, housewives, mechanics, farmers, motorists, electricians. FIXIT FLASH with patented contacts tests many devices directly. Instant clip-on alligator lead and probe convert FIXIT FLASH to a bench type instrument. Shipped with test leads and instructions but less batteries. Send check or money order. Available only from

**$2.98** Postpaid

**B & B ENGINEERING & SALES** POST OFFICE BOX 3746 WASHINGTON 17, D. C.

**AUTO OWNERS...**

***GET SUMMER STARTING IN WINTER—SAVE BATTERIES SERVICE CALLS AND DELAYS!***

**E-Z-E START MOTOR OIL HEATER** keeps motor oil warm for easy starting in the coldest weather. You replace your present oil measuring stick with an Anger E-Z-E Start Motor Oil Heater. It operates from any 110 volt lighting circuit, and it is as economical as a 50 watt light. Endorsed by present users and sold on a money back guarantee—$7.95 postpaid. Send check or money order with *make, model* and *year* of car.

***WRITE FOR FREE FOLDER!***

**ANGER MANUFACTURING CO.**
Box 4787, Redford Station • Detroit 19, Mich.

**SELF-CONTROL STARTS HERE**

AND TO RESTORE CAR PERFORMANCE

**OIL-CONTROL STARTS HERE**

**To stop oil-pumping, replace worn engine connecting rod bearings**

Tempers flare when poor engine performance leads to sluggish, costly car operation.

Worn connecting rod and main bearings are a major cause of oil-pumping. They let excess oil overburden the piston rings. Oil gets into combustion chambers; burns to carbon on pistons, rings, valves and spark plugs. *Performance goes up in smoke!*

Give the piston rings a chance to do their own job. Check the *bearings* on every overhaul. When worn, replace in sets with Genuine Federal-Mogul Bearings, *engineered* for the job of oil-control. *Ask your mechanic!*

**FEDERAL-MOGUL SERVICE**
(Division of Federal-Mogul Corporation)
**DETROIT 13, MICHIGAN**

***CONTROL OIL-PUMPING WHERE IT STARTS—REPLACE WITH***

**FEDERAL-MOGUL**

OIL CONTROL **BEARINGS**

ABE WILL SAVE YOUR CAR




Copyrighted material

# Comfort

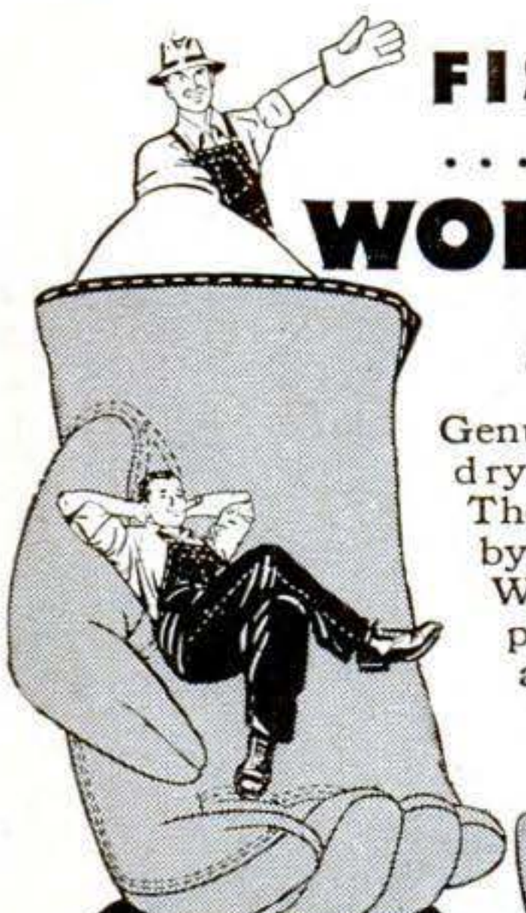
by the

**FISTFUL!**

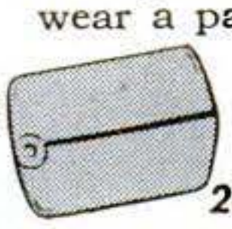
...Yours in

**WOLVERINE**

***Pigskins***



Genuine Pigskin! They dry soft — stay soft! They're tanned that way by the exclusive Wolverine triple tanning process. Extra wear, and plenty of it, on any work-glove job. Just wear a pair and see!



***FREE***

*2-Way Comb*

A NEW PAIR **FREE** IF THEY DRY OUT HARD OR STIFF!

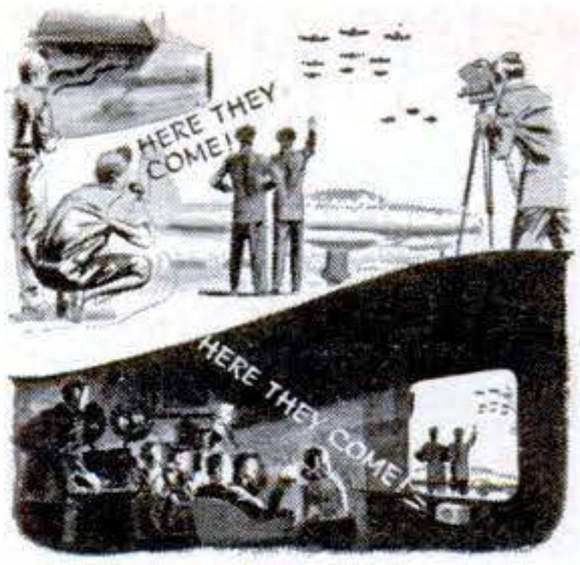
Who's your dealer? Just write us and we'll tell you and also send you, FREE, a handsome Wolverine 5-inch colored plastic comb that folds away to a 2" by 2½" compact for purse or pocket. Offer limited to Continental U.S. only.

**WOLVERINE** ROCKFORD, MICHIGAN Department JL-12

---

***Shoot your own TALKING PICTURES!***

...with the New "Cine-Voice" 16mm Sound-On-Film Camera $695.00, money-back guarantee.



Write for free illustrated folder Auricon Hollywood

**BERNDT-BACH, Inc.** 7335 Beverly Blvd., Los Angeles 36, Calif.

16mm SOUND-ON-FILM EQUIPMENT SINCE 1931

---

## FREE ADVERTISING SERVICE!!

If there is anything that you want to buy, sell, or trade—If you want a job, need help, or want a partner—Send your ad to the FREE ADVERTISER and it will be printed and distributed nationally without charge or obligation. You don't even have to be a subscriber. Limit ad to 50 words including name and address.

**READ THE FREE ADVERTISER**

Interesting articles and a treasure house of bargains.
Single copy 20c By the year $2.00

**THE FREE ADVERTISER, Dept. S-12**
27 Neptune Avenue Woodmere, N. Y.

---

## BULL DOG JACKS

**Makes parking or hitching trailers and heavy farm implements an easy, one-man job**

Model No. 60-F Only $15.75 Post Paid (when paid in advance)

All steel construction—heavy duty ball bearing swivel action . . . raise and lower with crank . . . complete with bracket, ready to install

**HAMMER BLOW TOOL COMPANY**
Wausau 14L, Wisconsin

---

## FREE! GET BIG 34-PAGE CATALOG

Tells how to train for AVIATION CAREER in Aeronautical Engineering and Aircraft & Engine Mechanics

**NORTHROP AERONAUTICAL INSTITUTE**
1525 E. Broadway, Hawthorne (Los Angeles County), Calif.

Name_____ Age_____

Address_____

City_____ Zone_____ State_____

---

## STUDY TO BE A DOCTOR

***of Psychology or Metaphysics***

Obtain a Ps.D., Ms.D., or Ph.D. degree. Be a Teacher, Lecturer or Accredited Practitioner. Teach others how to achieve Health, Happiness and Contentment. Chartered by State. Write for FREE book telling how.

**THE NEOTARIAN COLLEGE OF PHILOSOPHY**
Desk 5, Pickwick Building Kansas City 6, Missouri

---

## UNLIMITED OPPORTUNITIES IN ENGINEERING

**DEGREE IN 27 MONTHS**

**Study Engineering** in this world-famed school, established 1884. Demand for our graduates exceeds supply. Growing shortage of engineers. No field offers greater opportunities for responsible, lucrative positions.

**Bachelor of Science Degree** in Mechanical, Civil, Electrical, Chemical, Aeronautical, Radio (Television) Engineering; Business Administration and Accounting. Also 36-weeks certificate courses in Surveying and Drafting.

**Personalized Instruction.** Accelerated courses. Non-essentials eliminated. For ambitious, earnest students. Earn your degree in the shortest possible time. Preparatory courses. Placement service.

**Extensive Campus.** Well equipped, new and modernized buildings; up-to-date labs. Low cost. New terms start quarterly. Enter September, January, March, June.

**Mail Coupon Today**

**TRI-STATE COLLEGE**

5122 College Avenue, Angola, Indiana
Please send me free catalog and special information. I am particularly interested in courses as checked:
☐ Mechanical ☐ Civil ☐ Electrical ☐ Chemical ☐ Aeronautical
☐ Radio (Television) ☐ Business Administration ☐ Accounting
☐ Short Diploma Courses

NAME.....

ADDRESS.....

---

## RUPTURE

**RELIEF...OR YOUR MONEY BACK**

Write now for free booklet and pictures of rupture care. You can be helped...work steady, with low cost, easy to wear Web Truss, thousands satisfied.

**WEB TRUSS CO.** Dept. PS-12, Hagerstown, Maryland

---

## Party Records

**FOR ADULTS ONLY**

THEY'RE SENSATIONAL! Brand new series of exclusive phonograph records. Spicy songs that will make your party a howling success. Songs and music in a style you will like. Complete set of SIX DIFFERENT songs on good quality 10-inch 78 R.P.M. records, sent prepaid for $4.95 in sealed package. No C.O.D.'s.

**NATIONAL, Dept. 478,**
BOX 5—STA. E TOLEDO 9, OHIO



Copyrighted material

## Make More Money

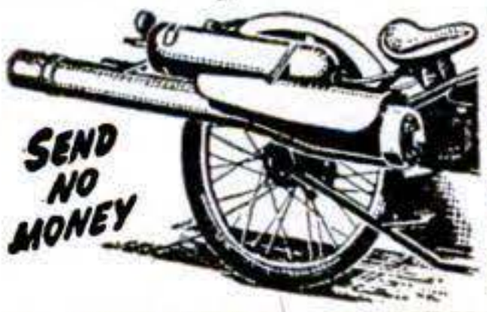
**Architecture & Building**
**Drafting & Design**
**Contracting & Building**

### Advance Faster

• Don't envy the man who has a big-pay job in the building field or who is starting a business of his own. In spare time at home get the practical training that can enable you to reach high income brackets, independence, security. Don't gamble with your future. Write BUILDING on a post card, with your name and address, and mail it to this 55-year-old home study school AT ONCE. Full information will be supplied. No obligation.

**AMERICAN SCHOOL, Dept. B 946, Drexel Ave. at 58th St., Chicago 37, Ill.**

## Build your own *JET ENGINE!*




**Order these plans today**

1. JET PROPELLED BICYCLE. Assemble your own. Photo and instructions $1.00.
2. HOW TO MAKE EXPERIMENTAL JET ENGINES. Seven sheets drawings with information and instructions $2.95.
3. BOTH OF ABOVE in one order $3.75.

SEND NO MONEY. Order both at once $3.75 C.O.D. in USA plus c.o.d. postage. Send check or Money Order and we pay postage. Get other information too. Rush Order.

**J. HOUSTON MAUPIN, Dept. 66, Tipp City, Ohio**

## BOAT KITS

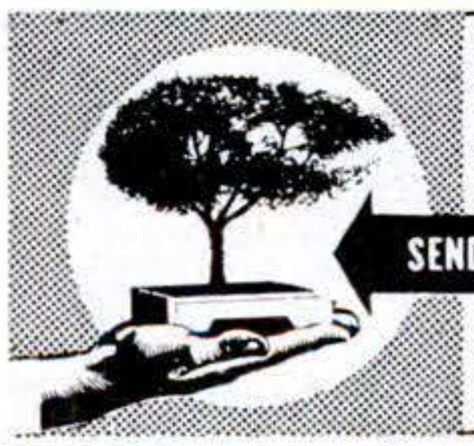
12 ft. model pictured

- Use simple tools to assemble
- Step-by-step instructions
- Precision pre-shaped parts
- One-piece plywood planking
- Screws, paint included

Marine hardware & complete accessories

**Complete Catalog of all models 10c**

**LUGER INDUSTRIES** Marine Division 3207 FREMONT AVE. SO. MINNEAPOLIS 8, MINN.



## GROW MINIATURE TREES

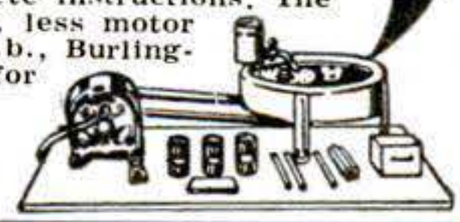
Grow authentic, LIVE dwarf trees!
Fascinating hobby! Fabulous profit!

**SEND FOR FREE SEED & INSTRUCTIONS!**

**MINIATURE NURSERY CLUB**
Dept. 4-D, P.O. Box 18696, Rimpau Sta.
Los Angeles 19, California

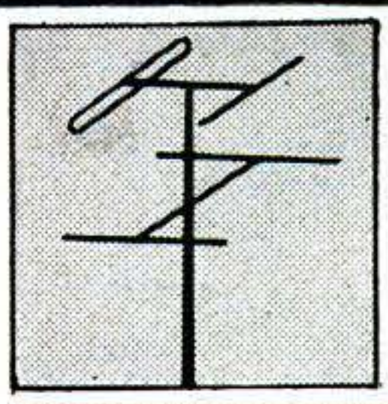
## make your own *Gems* 29.50 F.O.B.

The Gem Maker comes complete with all necessary equipment, including a super-charged diamond blade for sawing, and all wheels for grinding, shaping and polishing; also complete instructions. The complete equipment as shown, less motor and belt, for only $29.50, f.o.b., Burlington, Wisconsin. Write today for information and literature.



**B & I MANUFACTURING CO.**
Dept. S Burlington, Wis.

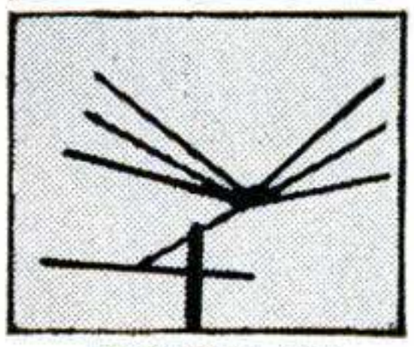
## SUPER POWER TV ANTENNAS & ACCESSORIES AT BARGAIN PRICES



Save up to 50%. Pre-Assembled Antennas Direct from Distributor. Quality Materials—Easy to erect by anyone. Needed in all fringe areas. Select yours now, note better reception.

**HI-LO TV ANTENNAS**

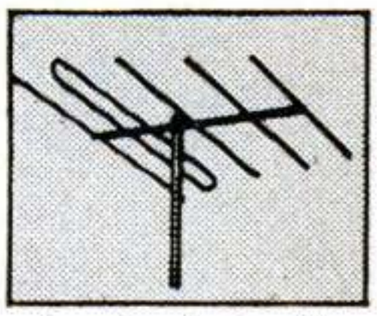
High or Low reception Famous make—complete, ready to install. Widely used. Gives good results everywhere. **Reg. $11.95 Now $6.95.**



**CONICAL TV ANTENNAS**

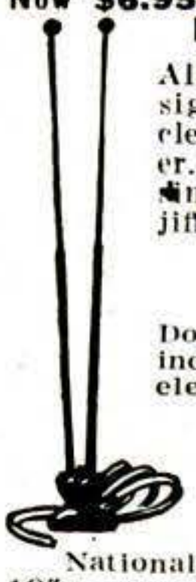
Widely used Hi-Gain broad band. Exceptionally Popular Country or City Areas. **Reg. $11.95 Now $6.95.**

**YAGI TV ARRAYS**



Finest on market Fringe & Ultra fringe areas. Highly directional, closely tuned, all channels, 2 to 13 — Cuts interference, noise & ghost reflections. Individual array for each channel.

For Channels 2-3-4-5-6 **Reg. $28.95 Now $11.95**
For Channels 7-8-9-10-11-12-13 **Reg. $12.95 Now $7.95**



**EASY TO USE TV BOOSTER**

All fringe area residents can boost signals and get better reception, clearer picture with Lexington Booster. Performs all channels. Only 1 simple dial. Attaches to any TV set in jiffy. **A $39.95 value. Only $18.95**

**INDOOR V ANTENNAS**

Double 3 Sectional 40 inch telescopic brass elements. Attractive heavy duty base. Portable. **Reg. $6.95 Now $2.95.**

**GUARANTEED STANDARD BRANDS of TV and RADIO TUBES**

40% off on quantities of 10 or more. $5 deposit with order, mention tube selection or model of TV or Radio Set. FACTORY GUARANTEED.

**BRAND NEW TV CATHODE RAY TUBES**

Nationally known brand in Original New Factory Cartons.

| | | | | |
|---|---|---|---|---|
| 10" | | $18.75 | 19" Metal or Glass | $37.00 |
| 12" | | 23.75 | 20" | 35.50 |
| 16" | Glass | 27.00 | 21" | 39.95 |
| 16" | Metal | 28.25 | 24" | 69.00 |
| 17" | | 25.50 | ONE YEAR GUARANTEE | |

**300 OHM POLY. WIRE $2.00 per 100 FEET.**

**OUR NEW DX-630 CHASSIS GIVES TV RECEPTION UP TO 200 MILES**

1953 **MODEL**—Actual Field Tests prove this best chassis with **CASCODE TUNER** on market for areas up to 200 miles away from station. **HAS 4 MICROVOLT SENSITIVITY**—10 times any other TV receiver. Picks up distant stations without use of booster or special arrays and with less noise. Operates any tube including 24", greater brilliance, improved keyed AGC circuit (eliminates flickering and fading). Best materials with high factor of safety to insure trouble-free operation. STD. RTMA GUARANTEE Free Replacement of defective parts or tubes for 90 DAYS. Completely factory-wired chassis ready to operate with 12" P.M. Speaker, Hardware & Knobs.

**Price incl. Excise Tax.....only $169.50**

**ORDER TODAY—Price Subject to Change**

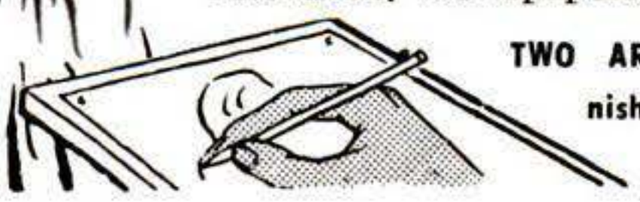
QUANTITIES LIMITED. Mail Check or Money Order today or 50% deposit. Pay bal. C.O.D. Mention item and channels you have.

**TELEVISION CLINIC** Dept. S12, 442 East 86th St., New York 28, N. Y.

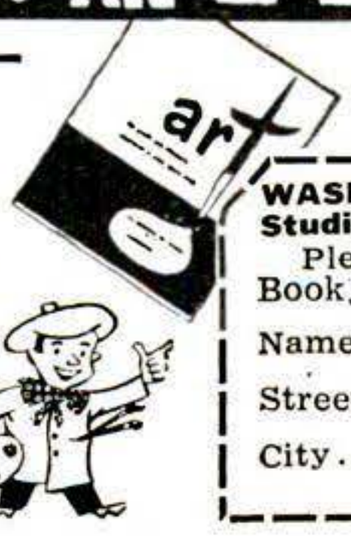
## DRAW for MONEY... BE AN ARTIST!

**Learn at Home in Spare Time—Train for Profitable Career**

Commercial Art, Designing, Cartooning—one complete, practical course. Step-by-step method teaches beginners quickly. For 38 years W.S.A. has been preparing graduates for good-paying art jobs in Advertising, Television, Newspapers, Art Studios, etc.



**TWO ART OUTFITS furnished. Low tuition; easy terms.**




**TRIAL PLAN** offered—mail coupon today for FREE illustrated booklet—"Art for Pleasure & Profit."

**WASHINGTON SCHOOL OF ART**
**Studio 1312F, Washington 5, D.C.**
Please send me full information and your Free Book, "Art for Pleasure & Profit."

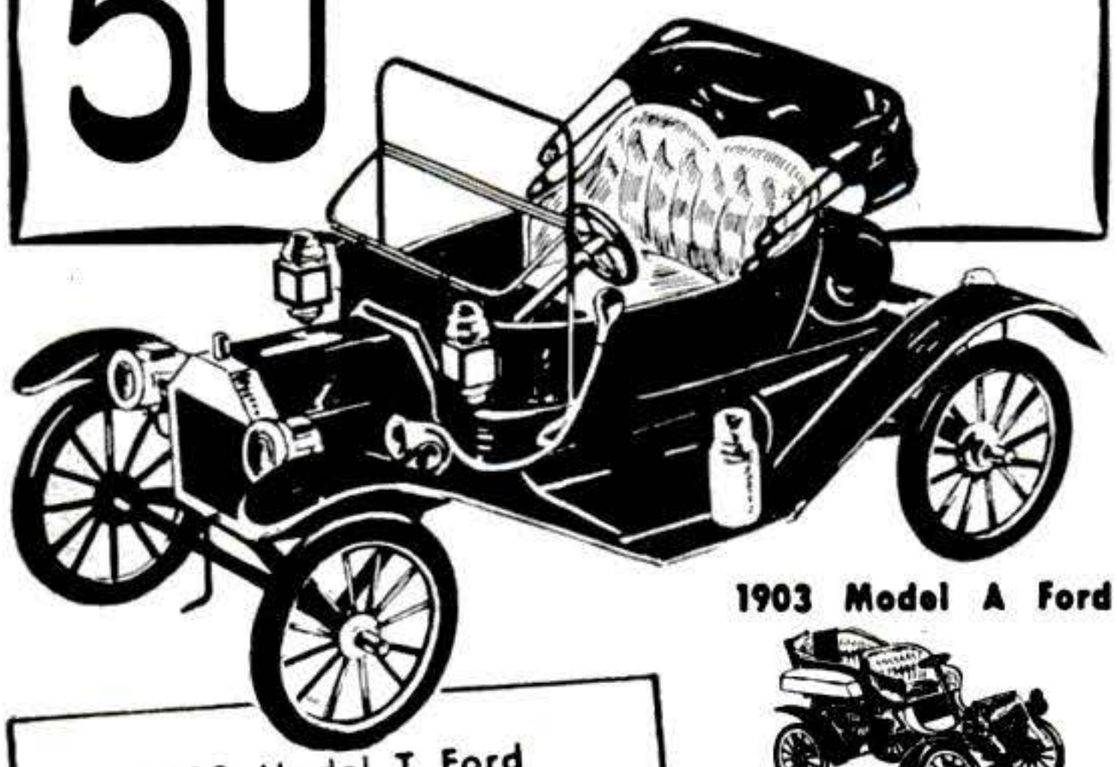
Name.....Age.....
Street.....
City.....Zone.....State.....

**Course G.I. Approved for Eligible Vets**



Copyrighted material

# 50 YEARS OF FORDS



1903 Model A Ford

"First in the Ford family"
Complete Kit - - $2.50

1909 Model T Ford

Built for Economy and Dependable performance.
Complete Kit - - - - $2.95

1910 Model T Ford

One of the most popular cars of its day. Now in kit form, authentic in every detail. Yours for easy building with prefabricated parts. Complete with instructions. $2.50

Kits sold at Hobby, Toy or Department stores, or write us. Add 25¢ for postage and handling.

**OLD TIMERS** SCRANTON HOBBY CENTER
DEPT. 28 SCRANTON 10, PA.

## The SPEEDY STITCHER

Sews quick and strong, making new or repairing all sorts of leather and canvas articles—boots, shoes, coats, gloves, belts, saddles, golf bags, Ski, Football, Baseball, Skating, Hunting, Fishing, Camping togs, grain bags, burlap, etc.

Each stitcher comes ready to use with a reel of waxed thread and 3 needles, assorted sizes. Needles are carried in handle. A handy tool for home or on hunting, fishing or camping trips.

Price Postage prepaid $1.00

LYMAN BRADFORD CO.
Box No. 350 KINGSTON, MASS.

## NEW "PAINT PEN"

**PAINT STRIPING TOOL**
***Works like a Fountain Pen***
**Stripes with Paint instead of Ink!**

This amazing new "PAINT PEN" is a Paint Striping Tool that makes it easy to do expert striping on furniture, bikes, model planes, autos, signs, toys, linoleum, wall board, etc. Makes plain, painted walls look like tile. Paint straight, curved, circular or evenly spaced parallel lines the same way a professional painter does. Simply fill Tubular Glass Paint Fountain with any color paint and wheel tip feeds paint evenly. Tips interchangeable — jaws split apart for easy cleaning. Tool complete with tip for 1-16 inch stripe only $1.00 postpaid. Other complete tools with 1-64, 1-32, 3-64, 1-16, 5-64, 3-32, 1-8 inch tips, $1.50 ea. Extra tips, 75c each. Complete KIT with 7 tips, $5.00. C.O.D.'s postage collect. Here's the handiest tool in your whole painter's kit. Get yours today.

**Paint STRAIGHT, CURVED OR PARALLEL LINES**

**Home Craftsmen**

Just the tool you've been waiting for! New Paint Striping Tool gives "professional" results every time, yet simple and easy to use as a fountain pen. Adjustable guide keeps lines straight as an arrow. Just as easy to make curves or free hand designs. Adds new beauty and finished look to everything you paint. Send $1 now!

Only $1.00

**DEALERS**
PAINT STRIPING TOOL packed in display cartons of 1 doz. Fast, profitable seller. Write for illustrated circular, discounts

WENDELL MFG. CO., Dept. 2-W
4234 LINCOLN AVENUE, CHICAGO 18, ILL.

## EARN BIG MONEY... RAISE RARE *Tropical Fish*

**NEW SPARE TIME HOME-BUSINESS**
**FOR PLEASURE AND $ $ $ PROFITS**

Wonderful opportunity! No experience needed—no expensive equipment to buy. It's easy and fascinating to breed "Tetras" that LIGHT-UP like neon signs; "Gourami" that are 12 DIFFERENT COLORS; "Fighting Fish" that FIGHT UNTIL DEATH; "Rosy Tetras" that are TRANSPARENT; "Danio" that are STRIPED LIKE A ZEBRA—hundreds of fascinating rare varieties. SOME SELL FOR $50 EACH & MORE! Takes only minutes per day. WE SUPPLY EVERYTHING YOU NEED. HELP US FILL HUGE DEMAND from homes, interior decorators, clubs, hotels, pet stores, flower shops, schools, etc. Fabulous Profits! FREE Illustrated Plan & Details. RUSH name and address to:

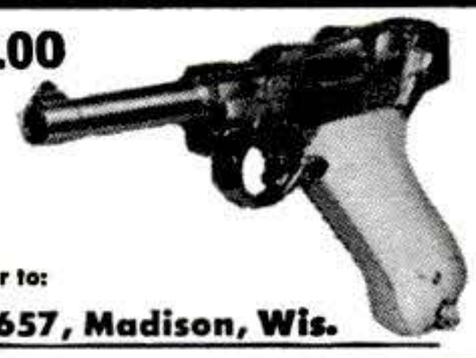
**Free HOME-BUSINESS PLAN**

TROPICAL FISH BREEDERS OF AMERICA, Dept. C12, Los Angeles 15, Calif.

## MAKE IT YOURSELF!

It's easy. Kit includes all wood parts cut to shape. Material for metallic finish included. All you need is a penknife. Nine authentic full scale models from which to choose.

**$3.00**



***9mm LUGER***

Send 10c in Coin for NEW Illustrated Folder to:

O'BRIEN GUNCRAFT, P. O. Box 657, Madison, Wis.

## *learn to HYPNOTIZE!*

Command others with hypnotic power! Amaze everyone with your new spellbinding technique. New easy to master course teaches you this mystic art, quickly, expertly, professionally. Have subjects at your mercy. Make them obey your every desire. Send for this Valuable Book Now! Just pin $1 to this ad and "25 lessons in Hypnotism" will be mailed to you postpaid. Satisfaction guaranteed or your money back.

Books Publishing Co., 56 W. 24th St., New York 10, N. Y.

## Broken or Loose FALSE PLATE?

Make Plates Like New

**Fix it Yourself EASILY in a Few Minutes**

Your plates may become broken or loose just when you need them most. With FIX-IT-KIT you can repair your own broken plates. Also tightens loose fitting plates, easily. Get permanent comfort with professional material. Complete instructions. Satisfaction guaranteed or your money refunded. *Order Now* at a new low price only **$2.98** postpaid — or sent C.O.D.

DEN.-FIX DENTAL PRODUCTS, Dept. PS-12
P.O. Box 674 Kansas City 8, Missouri


Statement of Ownership, Management, Circulation, etc., required by the Act of Congress of August 24, 1912, as amended by the Acts of March 3, 1933, and July 2, 1946 (Title 39, United States Code, Section 233) of Popular Science Monthly, published monthly at New York, N. Y., for October 1, 1952.

1. The names and addresses of the publisher, editor, managing editors and business manager are Publisher, Popular Science Publishing Co., Inc., 353 Fourth Avenue, New York 10, N. Y.; Editor, Volta Torrey, 353 Fourth Avenue, New York 10, N. Y., Managing Editor, Howard Allaway, 353 Fourth Avenue, New York 10, N. Y., Business Manager, Godfrey Hammond, 353 Fourth Avenue, New York 10, N. Y.

2. The owners are: Popular Science Publishing Company, Inc., 353 Fourth Avenue, New York 10, N. Y.; Stockholders of Popular Science Publishing Company, Inc.; Mansell and Company, 45 Wall St., New York 5, N. Y.; Oliver B. Capen, Capeswold, Bedford Village, N. Y.; Noreen S. Capen, Capeswold, Bedford Village, N. Y.; Robert Cade Wilson, 683 Springfield Avenue, Summit, N. J.; Ada B. Wilson, 683 Springfield Avenue, Summit, N. J.; Marguerite N. Cole, Round Hill Road, Greenwich, Conn.; Irma V. Hammond, 1 Carstensen Rd., Scarsdale, N. Y.; Helen B. Glennon, 65 Prospect Ave., Larchmont, N. Y.

3. The known bondholders, mortgagees and other security holders, owning or holding 1 percent or more of the total amount of bonds, mortgages or other securities are: none.

4. Paragraphs 2 and 3 include, in cases where the stockholder or security holder appears upon the books of the company as trustee or in any other fiduciary relation, the name of the person or corporation for whom such trustee is acting; also the statements in the two paragraphs show the affiant's full knowledge and belief as to the circumstances and conditions under which stockholders and security holders who do not appear upon the books of the company as trustees, hold stock and securities in a capacity other than that of a bona fide owner.

(Signed) Godfrey Hammond, Publisher

Sworn to and subscribed before me this 3rd day of October 1952. Esther Eyl, Notary Public, State of New York No. 24-6219000. Qualified in Kings County. Certificates filed with: New York and Kings Co. Clks & Register. Commission expires March 30, 1954. (Seal).



Copyrighted material

# ELECTRIFY your SEWING MACHINE

**NEW LOW PRICE! $10.50** 1 YEAR GUARANTEE

Buy direct from manufacturer and save! Kit comes fully wired, installed in a jiffy. Fits all machines! You get **ALL-NEW PARTS**

- Motor & Bracket
- AC-DC 115v 60c
- Multi-speed foot control
- Cord set & block
- Easy instructions
- Steel pulley & belt

**FREE . . . reg. $2.95 chrome SEWLITE given with every kit.**

**10 DAY FREE TRIAL—ORDER NOW!**

Send no money, pay COD or send money order and we'll pay postage. Please state whether wheel on your machine turns toward you or away from you. Shipping wt. 6 lbs.

**SENIOR SEWING MACHINE CO.**
Box 40 Dept. PS-42 Bklyn 5, N. Y.

# 52 BALLOONS THAT MAKE GIANT CIRCUS ANIMALS $1

Some blow up 3 ft. to 4 ft. Easy to make GIANT CIRCUS ANIMALS —instructions included. 4 ft. Ostrich, 3½ ft. Giraffe, a yard full of 12" kittens. Make a big SANTA CLAUS and a set of REINDEER. FREE with each $2.00 order a genuine balloon squawker. FREE with each $5.00 order 50 plastic toys (A Complete Western Rodeo).

**CIRCUS BALLOONS, Dept. PS-12**
**62 Garth Road, Scarsdale, N. Y.**

# STOPS FOGGY WINDSHIELDS
## NEW Chemical Mitt

**Amazing Discovery!** Autoists wild over new FOG-STOP Windshield Cleaner. Simply glide over windshield chemically-treated Mitt—at once glass sparkles crystal clear. Blurry mist, frost, sleet, snow disappear like magic. Stops fogging. *Sells like wild!*

**SAMPLES FOR AGENTS** Sample offer sent immediately to all who send name at once. Hurry. Postcard will do. SEND NO MONEY—*just your name.* KRISTEE CO., Dept. 712, AKRON 8, OHIO

# TALK—SING—PLAY
## OVER YOUR RADIO

with the real Radio Mike! Attaches in a jiffy—full instructions given! Swell for "parties"—"cut in" on or "kid" regular network programs or put on your own broadcasts! Amaze your friends—real fun. Beautiful Metallic Plastic 6 in. high!

**12 RADIO BROADCAST LESSONS GIVEN with each mike**

**SEND NO MONEY** Just pay postman $3.99 COD plus postage or send $3.99 and we pay postage! *Radio Mike* is available *only* from us by mail—*guaranteed.*

**Midway Co., Dept. MPS-12, Kearney, Nebr.**

## LEARN TO THROW THE BOOMERANG

A Fascinating Sport and Unique Gift

SEND FOR YOURS TODAY

Flight Tested – Guaranteed to Return
Golden Red, Jade Green or Natural
with Story and Instructions **$2.00 ea. Postpaid**

**CARVED by COL. JOHN M. GERRISH**

4409-P S. W. Parkview Lane-Portland 1, Ore.

# MILE-O-METER

Reg. U.S. Pat. Off.

*No Finer Gift*

**FOR ANY MAN WHO OWNS A CAR**

● Mile-O-Meter is the most practical and fascinating gift any car owner can receive. It mounts permanently on the dashboard (without drilling any holes) and continuously indicates both "miles-per-gallon" and the condition of the engine, warning clearly when minor adjustments are necessary to prevent costly breakdowns and repairs. Fully endorsed by leading automotive associations. Fits all cars — really simple to install. Mile-O-Meter is the automotive accessory that every man wants. Beautifully gift-wrapped. Orders mailed same day received. Money-back guarantee.

**$14.95** Ppd — Deluxe Illuminated Model 3⅛" dia. Fed Tax incl.

**$9.75** Ppd — Standard Model 2⅛" dia. Fed Tax incl.

Order from
**GALE HALL ENGINEERING Dept. 301**
**107 Northampton St., Boston 18, Mass.**

FREE with your order 24 Page Motorist's Manual, Instruction booklet, and handy Mileage Calculator

Please send....Deluxe....Standard Mile-O-Meters at $.....

Name_____

Address_____

City_____ State_____

☐ Check enclosed ☐ C.O.D.

☐ Gift Wrapped (free) ☐ Gift Card (if desired)

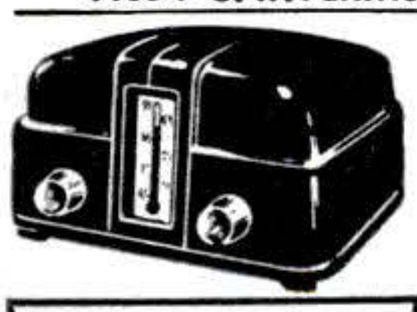
Send check or M. O. . . . shipped prepaid (add 35c for special delivery). C.O.D.'s accepted (plus postage).

MAKE EXTRA MONEY **PLASTICS** LEARN AT HOME

There are RICH OPPORTUNITIES for MEN and WOMEN with "know-how" in Plastics. Interstate's new Plastics course tells and shows how to make hundreds of fast selling items out of Plastics. Gives complete training in fabrication, casting, lamination, molding, internal carving, etc., in simple, easy, step-by-step language and pictures. Plastics and Fabricating Kits for 23 valuable Plastic items come with training at no extra cost. START A PLASTICS BUSINESS OF YOUR OWN. No other industry holds such promise for the future. You can make big money manufacturing novelties, toys, signs, etc., in your own home in spare or full time. Don't wait! Learn NOW how Interstate's Plastics Training qualifies you for success in the Plastics field.

**PLASTICS AND SUPPLIES FURNISHED FOR 23 VALUABLE PROJECTS**

**INTERSTATE TRAINING SERVICE**
Dept. C2N Portland 13, Oregon



Ideal for servicemen, hams, engineers, tinkerers, hobbyists and electronic students

# A PRECISION-BUILT ELECTRONIC UNIT with a 1000 USES

It seems impossible . . . giving away an 110V AC, UL approved, Electronic Unit completely wired and housed in a beautiful plastic case. Why! the sensitive plate relay alone is worth more than the $2.49 we're asking. If you were to consider the many uses to which it can be modified and to study the list of parts below, you will then understand the terrific buy we're offering and rush to send in your order today.

1–115V-6.3V Filament Transformer
1–S.P.S.T. Sensitive Plate Relay
1–S.P.S.T. Switch
4–Paper Tubular Condensers
1–Electrolytic Condenser
1–Potentiometer

**Loaded With Valuable Standard Parts**

6–Carbon Resistors
7–Wire Wound Resistors
Pilot Lamp, Dial Assembly
3–Tube Sockets
Plastic Cabinet 5¾x5x3¼, Knobs, Feet & asstd. Hardware, Schematic Diagram

**FOR ONLY $2.49 postpaid**
**WORTH 5 TIMES THIS PRICE**

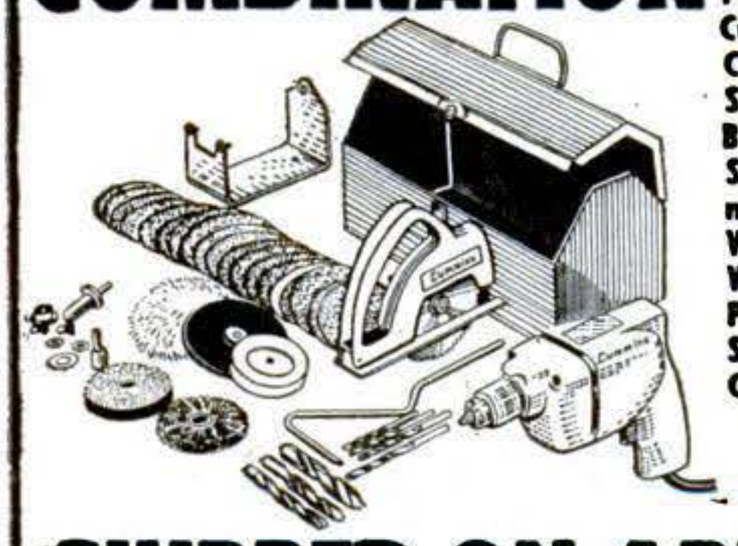
**MANUEL KLEIN CO. 94C Chamber St. New York 7, N. Y. Rector 2-6460**




Copyrighted material

## The New Improved Model 38-98

# DYNAMIC POWER TOOL COMBINATION



**INCLUDES:** Cummins 1/4" Pistol-Grip Electric Drill; Cummins Saw Attachment; Combination Saw Blade; Set of Drills; Lambs Wool Bonnet; 13 Sanding Discs; Steel Arbor and Attachments; Cloth Buffing Wheel; Grinding Wheel; Wire Wheel Brush; Steel Paint Mixer; Steel Bench Stand; Portable Steel Carrying Case.

Price of Dynamic Power Tool Combination complete is $29.95

## SHIPPED ON APPROVAL

**No Money With Order — No C.O.D.**

Try it ten days before you buy. If completely satisfied then send $4.95 and pay balance at rate of $5.00 per month for 5 months — No Interest or Carrying Charges Added. If not completely satisfied, return to us, no explanation necessary.

KAPNER HARDWARE, INC.
Dept. A-56, 2248 Second Ave., New York 29, N. Y.

Please rush 1 Dynamic Power Tool Combination. I agree to pay $4.95 within 10 days after receipt and $5.00 per month thereafter.

Name.....

Address.....

City..... Zone..... State.....

# KIT BOAT OWNERS

Protect your boat with Fiberglas* Boat Armor. New ready mixed laminator eliminates measuring and mixing, assures perfect job. No experience necessary, easy to apply.

Boat Armor makes new and used boats watertight, lengthens lifetime, strengthens construction, increases value, adds to appearance and safety. Ideal for decks and cabin roofs.

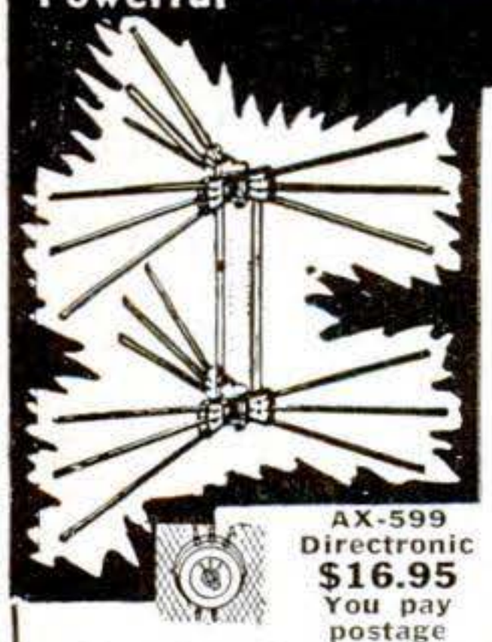
**RUSH 10¢** postage for interesting, illus. booklet, and detailed instructions.

*T.M. Reg. O. C. Fiberglas Corp.

**EVER GLASTING (U-MAK-IT PRODUCTS)**
703R WHITTIER STREET
BRONX 59, N. Y. CITY

## Amazing NEW MOTORLESS TV Antenna

Super Powerful **All Channel TV RECEPTION IN ALL DIRECTIONS**



AX-599 Directronic
**$16.95**
You pay postage

Rocket DIRECTRONIC MOTORLESS TV ANTENNA
360° Electronically Switched Beam

- No Motors
- No Roof Orientation
- No Electric Power
- No Ghosts
- Flick of Switch Clears Picture Instantly

In the city or in an ultra-fringe area, the Directronic will out-perform ordinary antennas. Only the Motorless 360° Directronic TV Antenna offers "around the compass" reception WITHOUT Rotors. Clarity of picture will amaze, it's so bright, so sharply defined. AX-599 "Serviceman's Array" contains Hi-Pac molded insulator of extremely high tensile strength, 18 hi-tensile aluminum alloy elements, 1 set of connecting stubs (3), Universal U-Clamps for masts to 1½", Directronic Beam Selector, 75 feet of Tri-X Cable.

Do not remit more than complete purchase price. 25% deposit on C.O.D. orders, please. Money-back guarantee.

**NATIONAL ELECTRONICS OF CLEVELAND**
412 DELCO BLDG. CLEVELAND 3, OHIO

# MEN! send for this MONEY-MAKING OUTFIT FREE!

**MAKE UP TO $15.00 IN A DAY**

Do you want to make more money in full or spare time . . . as much as $15.00 in a day? Then write for this BIG OUTFIT, sent you FREE, containing more than 150 fine quality fabrics, sensational values in made-to-measure suits and overcoats. Take orders from friends, neighbors, fellow-workers. No experience needed. You'll say it's the greatest way to make money you ever saw.

## PERSONAL SUITS TO WEAR

***Pay No Money! Send No Money!***

Our plan makes it easy for you to get your own personal suits and overcoats without paying 1c, in addition to your big cash earnings. This offer is limited. Rush your name and address for big FREE OUTFIT—today!

**PROGRESS TAILORING CO., Dept. P-220**
**500 S. THROOP ST., CHICAGO 7, ILL.**

# D-M "POCKET-PAL" RADIO

- Hearing-aid size portable
- Fits in your shirt pocket
- Enjoy as you walk along anywhere
- Tiny flesh color hearing-aid fone
- Covers standard broadcast band
- Walkie-Talkie type reflex circuit
- Received over 1,500 miles in test
- Pat. built-in ferri-rod antenna
- Two miniature high-gain tubes
- New long-life mercury battery
- Picture diagram for radio beginner

Patent Pending

Not a toy or gadget. A real ruggedly built self-contained portable. No clips or wires to attach to anything. Perfect for play-by-play at sport events. Ideal for use in bed, office or on outings. Beautiful unbreakable aluminum case, tiny control knobs, bakelite chassis with battery clips, hearing-aid resistors, condensers, volume control with switch, variable tuning condenser, etc. Complete prefabricated kit that anyone can assemble in one evening ONLY $9.95 postpaid. Tubes included but less batteries. Midget batteries $1.75 per set. Hearing-aid ear button available from us at low cost or use any type earphone. Nothing like this set available elsewhere.

**$9.95** Post paid

*All sets fully guaranteed. ORDER TODAY—NOW!*

**ELECTRONIC MINIATURES**
162 ORLEANS CIRCLE NORFOLK 9, VIRGINIA

# ITALIAN ACCORDIONS

All types, all models, Very best. Hand Made. Fully guaranteed. Buy direct from Factory representative at lowest wholesale prices, and Save Money. Also Button Accordions, Chromatic Accordions and Concertinas. We take any instruments in trade. Send name and Address for FREE catalog.

**ITALIAN ACCORDION MFG. CO.**
7600 Cottage Grove Ave., Dept. PS-12, Chicago 19

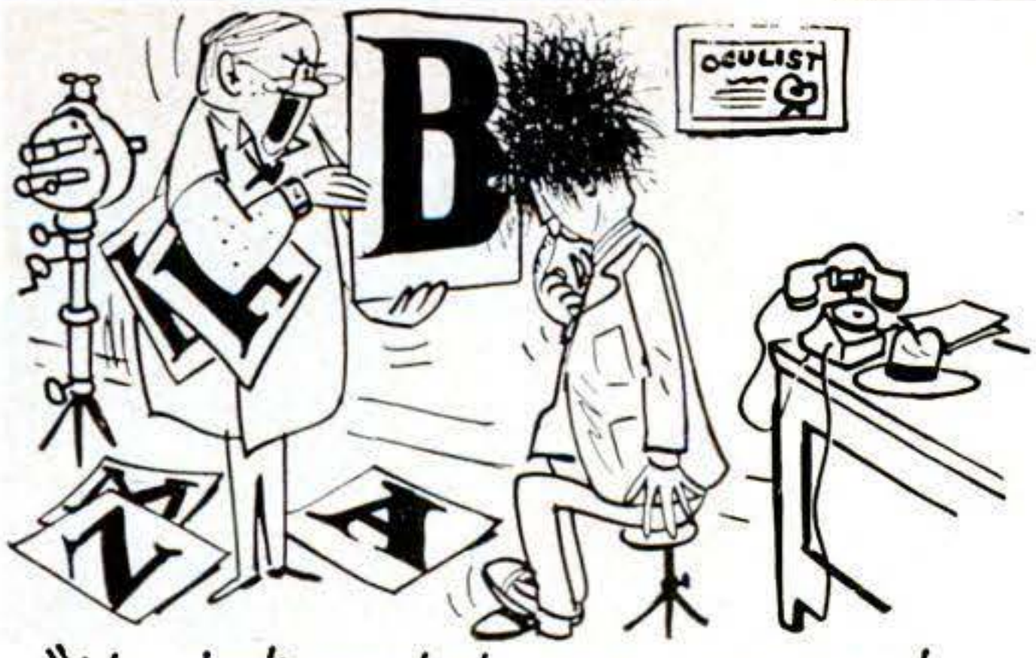
# EASE COLD MISERY

AT ALL DRUG STORES
★
45c and 75c SIZES

**Take Tabcin**
BRAND Reg. U. S. Pat. Off.



Copyrighted material




"You don't need glasses...you need Wildroot Cream-Oil hair tonic!"

"Says he's got to save the Wildroot Cream-Oil because it's his hair's best friend!"

"If he's ashamed of having dandruff why doesn't he use Wildroot Cream-Oil hair tonic!"

*YOUR HAIR'S BEST FRIEND*

**America's Favorite Hair Tonic!**

REAMER KELLER

**Ball-Bearing SPEED WHEELS**

**JUVENILE WHEELS** (No bearing, solid tires)

| | | | |
|---|---|---|---|
| 4" | 40c | 6" | 65c |
| 5" | 45c | 7" | 75c |

(Semi-pneumatic tire, ball bearing)

| | | | |
|---|---|---|---|
| 8 x 1.25 | 1.85 | 10 x 1.25 | 2.20 |
| 8 x 1.75 | 1.95 | 10 x 1.75 | 2.30 |
| 8 x 2 | 2.20 | 10 x 2.00 | 2.65 |
| 12 x 1.75 | 3.45 | | |

**INDUSTRIAL WHEELS**

Lug Base, Semi-Pneumatic tire

| | | | |
|---|---|---|---|
| 5 x 1.75 | 3.65 | 10 x 2.00 | 6.10 |
| 6 x 2 SW | 3.45 | 10 x 2.75 | 5.15 |
| 6 x 2.00 | 4.00 | 12 x 2.00 | 6.90 |
| 8 x 2.00 | 5.20 | 12 x 3.00 | 9.20 |
| 8 x 2.50 | 5.40 | 16 x 4.00 | 15.15 |

Smooth Base, Pneumatic tire and tube

| | | | |
|---|---|---|---|
| 8 x 3.00 | 11.00 | 12 x 4.00 | 12.10 |
| 10 x 2.75 | 6.80 | 4.00 x 8 | 13.10 |
| 10 x 3.50 | 10.55 | 14 x 4.50 | 13.40 |

Available Now—CASTERS

Write for circulars on all wheels.

Dealers, Jobbers, and Manufacturers! Our new prices will interest you.

No c.o.d. orders. Prices F.O.B. our plant.

**JIM BROWN TOY COMPANY**

1093 HOME AVENUE AKRON 10, OHIO

**$9.00 DOWN DELIVERS Brand New 29 Pc. ARGUS C-3 OUTFIT**

Balance as little as $6.12 per month!

**ONLY THE GENERAL** could give you so much: Argus C-3 Camera, Flashgun, Carrying Case, 35mm. Projector, 4 Filters, Filter Holder, Sun Shade, 10 Flash Bulbs, 6 rolls Ansco or Kodak reloads, 1 roll Color Film, 1 - 30"x40" screen, copy of "This is Photography".

ALL BRAND-NEW FOR ONLY $99.50

Mail order with down payment and short note about yourself, your occupation, age, employer for last two years, and two references. Write today!

*Use the General's famous "Pay as You Shoot" Plan*

$9.00 DOWN - BALANCE $6.12 MONTHLY

*The* **GENERAL CAMERA CO.**

Mail Order Div., Dept., P-12, Chicago 45, Ill.

EARN BIG MONEY!

**GROW "LIVING" MIDGET TREES!**

**AT HOME — SPARE TIME — NO EXPERIENCE NEEDED!**

It's new! Amazing! At last, the secret of growing miniature (MING) trees can be yours. FULL GROWN, dwarf trees—only a few inches high. Beautiful miniature fir, orange, oak, Chinese elm, peach, pine, cypress—any kind! All BLOOM and even BEAR FRUIT. All perfect healthy specimens—but miniature in size! Make costly home decorations and expensive centerpieces. (SOLD FOR OVER $1,500 EACH.) Big demand. Costs only pennies—takes only minutes per week. IT'S EASY! Fun! A new fascinating hobby—a new fabulous $$$$ business. Send for free secret plan details and real seed.

HOW TO LEARN GROWING SECRETS $ BOTH FREE SEED

**HELP US FILL HUGE DEMAND**

These trees are being demanded by STORES · CLUBS · HOTELS · FLORISTS · HOUSEWIVES · INTERIOR DECORATORS · COLLECTORS · HOBBYISTS—Big Money Opportunity for you.

**MAIL TODAY FOR FREE SEED AND PLAN!**

NATIONAL NURSERY GARDENS, Dept. N12
8463 South Van Ness, Inglewood 4, California
Rush me FREE PLAN and SEED IMMEDIATELY!

Name _____

Address _____ Zone _____

City _____ State _____




Copyrighted material

# Now! Earn $5..$8..$10..up to $12.50 per Hr.

SPARE TIME!

## Sensational New HOME-BUSINESS!

**AMAZING NEW PRINTING SECRETS CAN BE YOURS**

For Pleasure & Profit. Once you learn the closely guarded printing secrets of Screen-Print there's virtually no limit to how much "extra money" you can earn. SPARE-TIME WORK—For FULL-TIME PROFITS. Screen-Printing is the most fascinating Home-Business ever! Learn in a few days and start making money immediately. Even earn while you learn—it's amazing!

**LEARN AN "EXTRA TRADE"**

MEN! WOMEN! Learn Screen-Printing and make up to $200 per week—even working for someone else. Learn Screen-Printing and you learn an "extra trade."

**PRINT WITHOUT A PRINTING PRESS!**

OR ANY SPECIAL EQUIPMENT

SCREEN PRINT TRADE MARK REG.

### WHAT IS SCREEN PRINTING?

It's a revolutionary new method of printing—*WITHOUT* an expensive printing press. This amazing new development lets you print quantities of 25, 50, 100, 500 or even 1,000 in many cases, FOR LESS THAN YOU CAN PRINT ON A $5,000 PRINTING PRESS. Just put anything under a screen and take out beautiful products of printing—no expensive plates or "cuts" needed. No big overhead. Never has such an opportunity been offered the spare-time person who wants to make "Extra Income" in his home. This amazing NEW INDUSTRY can mean huge spare time profits for you.

**PRINT IN COLORS—EVEN NEW FLUORESCENT COLORS**

There's no limit to the number of colors you can use. It's easy to print in luminescent, "glowing" fluorescent colors, too. (These "brilliant" new inks can ONLY be printed satisfactorily by the Screen-Print method.) Screen-Print lets you print on paper, cardboard, leather, glass, wood, plaster, fabrics—anything!

**NO ART NECESSARY—EASY TO LEARN**

Anyone (young or old) can be a Screen-Printing expert—he doesn't have to be a "Rembrandt" either. Beautiful printing can be produced WITHOUT doing any art work whatsoever—simple tracing is all that's necessary in most cases. Simplified photo method ELIMINATES ALL HAND WORK. No camera needed.

**One of America's FASTEST GROWING BUSINESSES!**

Hundreds are already profiting handsomely with Screen-Print. This New method may revolutionize the printing business, as we know it today! Get the facts NOW!

**A BUSINESS OF YOUR OWN**

Be your own boss. Operate from the corner of your kitchen or garage. Build a successful future with a few cents worth of materials. Screen-Printing is the opportunity to establish a spare-time business without sacrificing job or pay check—have 2 INCOMES INSTEAD OF ONE.

"I already make 75% of my expenses doing Screen-Printing only spare-time" says Mr. E. L., Ontario.

**THERE'S $$$$ IN ADVERTISING!**

Here's your chance to GET INTO ADVERTISING—one of the largest paying businesses in America. Most Screen-Printing is used for advertising purposes. Materials cost you 10%—you can earn 90%—few businesses offer this high profit.

**HUGE DEMAND! ENORMOUS PROFITS!**

Millions of shops, stores, theaters, markets—almost any business needs Screen-Printing done for them. It's possible to even do your business by mail. No house-to-house selling either. You can make $10 to $20 profit on each dollar of cost on some jobs. Here's . . .

**YOUR "Chance of a Lifetime" OPPORTUNITY** to "cash-in" on a new printing method not generally known. We supply everything you need! From easy step-by-step instructions-secrets plus materials enough to make money immediately. A complete ready-made BUSINESS PLAN guides you every step of the way. This all can be yours—at our risk. Space here does not permit telling you all the terrific opportunities of Screen-Print. Don't waste a minute — mail coupon NOW! TODAY!—and get all the FREE FACTS and ACTUAL SAMPLE.

**FREE**

MY BOOKLET AND ACTUAL SAMPLE OF SCREEN-PRINTING. TELLS ALL THE FACTS ABOUT MY HOME-BUSINESS OPPORTUNITY PLAN.

SCREEN PRINT COMPANY Dept. 1C
1010 SO. LOS ANGELES ST.,
LOS ANGELES 15,
CALIFORNIA

**FREE BOOKLET AND REAL SAMPLE**
**MAIL TODAY!**

Screen-Print Co., Dept. 1C
1010 So. Los Angeles Street
Los Angeles 15, California
Dear Mr. Nowak: Please rush me booklet, facts, sample and entire Home-Business Plan. All this is Free. No salesman will call. I am under no obligation now or ever.

Name _____

Address _____

City _____ Zone ____ State _____



Copyrighted material

Classified Ads only 80c per word per insertion, payable in advance. Minimum ad 10 words. To be included in February issue, copy should be in our office by December 22. No cancellations accepted after December 15.

# CLASSIFIED OPPORTUNITIES

POPULAR SCIENCE MONTHLY-351 FOURTH AVE.-NEW YORK CITY 10

CIGARS—ideal Christmas gift. Turn to Desmar advertisement—Tobacco Section.

BUILD Your Own Microscope—200 power. Complete Castings, Mounts, Lenses, Screws Instructions—Kit $14.75. Free Illustrations. Esco, 911 Willow Ave., Hoboken, New Jersey.

A Grand Xmas or Birthday Gift, Unique Alligator Handbags, Shoes, Factory Prices, Free Circulars. Alligator, 316 Reina, Havana, Cuba.

MAKE $3.00 Hour at Home. Sewing Cutest Ready-Cut Baby Shoes. Baby Gay, Beaver Dam 16, Wisconsin.

DELUXE Embroidery kit for young girls $2.00. Prompt shipment guaranteed. Big Sister Industries. P.O. Box 421. Rome, Ga.

TAPE Recorders, Tapes, Accessories. Unusual Values. Dressner, 624 East 20th Street. New York City 9.

TOYS, Electric trains, model airplanes and engines, boats, race cars, model and hobby supplies, send 10c for catalog. Lionel or American Flyer Catalog 20c. Northeast Toy And Hobby Center, 4825 Independence Ave., Kansas City 1, Mo.

OPTI-Klos for Argus C-3. Take close-ups without tripod tape or wires. $7.95. Opti-Tek, Box 5s. Bell, California.

TRICK Of The Year, "Magic Moneymaker." Fool everybody. Only $1.25. Catalogue. Sample 35c. Rothleder, "102SMT" Cathedral Station, New York 25.

DOODLER'S Delight! Big novelty pad assortment. Over 200 pages of fun for youngsters or adults! Ideal stocking stuffer. Pencils free! $1.00. Ray Thompson Studios, Wyncote, Pennsylvania.

BARGAIN Gift Catalog 700 electrical products 25c refunded first order. Taylor Company, 2100 Dixie Highway, Pontiac, Michigan.

PATENT searchers $5.00, including patent copies. 48 Hour Airmail service. "Record of Invention" free. Same careful, reliable searches conducted for patent attorneys. Capitol Patent Service, Box 664-S, Washington 4, D. C.

CHRISTMAS presents—make your own —60 Patterns, toys, furniture, shelves, novelties, plus 88 page Hobby Book. $1.00. Crafters of Pine Dunes. Oostburg 9, Wisc.

"ECSTASY" Perfume. The Gift More Valuable than Platinum. ½ price $12.50. Nana. Box 2530, Denver, Colorado.

CHRISTMAS Novelty. Make your own centerpiece. Complete instructions only 50c. It will amaze you. Boyen, Box 173, Wall Street Sta., New York 5, N. Y.

"HELL'S Bells" in your automobile attract attention! Provoke laughter, amazement. Free literature. "Winco's". Box 9525. Dallas, Texas.

POSTCARDS! 48 state capitols. $1.25. Artcraft Colorpac. Box 13. Dayton 1. O.

LORD'S Prayer Cross Necklace with 12 imported Blue-White Rhinestones $1.00 Postpaid. New York Article Company, G.P.O. Box 405. New York 1, N. Y.

AMAZING New TV Booklet tells how to fix your own set! (150 Illustrations). Send $1.00 postpaid. Gadsby Sales, G.P.O. Box 449. New York 1. New York.

PANNING Gold lesson—Catalogue Beginners supplies. Mining Books, Maps. "Where To Go" Free. Old Prospector, Box 792D2. Lodi, Calif.

TYPEWRITERS, Printing Devices, Office Machines, supplies, appliances. Dixie Graph, King, N. Carolina.

SALE Tame Red Squirrels, Raccoons. Dewey H. Balch. Castleton, Vermont.

EARN $15.000-$30.000 annually. Franchise protected. Guaranteed minimum $12.500 or money back. Live at home. No merchandise to buy. Self-employed. One of most exclusive and noncompetitive businesses in United States and Canada. Send 50c for explanatory book. Money refunded when book returned. Harrell & Company. Box A-2. Louisville, Illinois.

LAMP Size Cypress Knee $1.00! Cy Products. Ella Street. Lafayette. La.

BARTENDING and management. American Bartending School. P-334 S. Wabash. Chicago, Illinois.

HYPNOTISM—Homestudy! Degree! The Columbian College, Box 723-E. Covington, Kentucky.

BIG interesting mails three months 25c. year $1.00. Harvey Teeple. Decatur. Ind.

STAGECOACH surrey, horses, 20 kits. Folders 10c. Sample buckboard $1.00. Tontz' Country Store. Elsinore 9. Calif.

"INTERESTING Mails"—25c keeps your mail box full three months. Bentz, Desk-H/69. Chatawa, Mississippi.

AMAZING 8 oz. Ekeradio with short-wave batteries, headphones, antenna, $24.95. Servicemen $22.00. Guaranteed. Ekeradio. Pasadena 3. California.

REFLECTING Telescopes, completely assembled. 60... $29.75. Guaranteed Observatory clearness. Free information. Skyscope. 475 Fifth Avenue. New York 17.

CHRISTMAS catalog 5c. Motorbikes. Mowers. Home Appliances. Loren, Box 436. Danville 2. Illinois.

CIGAR Smokers "Pok-et-Pak" holds five jr. Phillies genuine leather $1.00. Free catalog. J. C. Blauvelt Co., Box 1008. Danbury. Conn.

LEARN Landscaping, simplified for low cost home improvement. Write Loveridge, Box 772. Albuquerque. New Mexico.

1000 EMBOSSED Business cards $3.95 prepaid. Price list with order. Bernard P. Lefferman, 237 East 87th Street, New York 28, N. Y.

SENSATIONAL invisible Crystal Radio Complete $2.98. Send $1.00 for Diode and drawing. Bill Cotter. Washington 18. D.C.

A Useful gift? Vacumite car vacuum cleaner. $3.98. Request details. William Wern. 333 N. Michigan. Chicago 1. Ill.

DOLLAR buys eight Art Pictures. Religious, Variety, girls. Bring $1.95 framed. Payne Sales. Des Moines 14. Iowa.

ARGUS C-3 owners, an always remembered gift is described under "Cameras, Photo Supplies" in this magazine. See Ontora Attachment.

20% DISCOUNT on all Films and Cameras. Mel's Photo. Box 106. Brooklyn 20. N. Y.

TREAT Yourself to a 7 jewel Swiss watch. 5 year guarantee. Bargain. $6.95 plus 10% tax. Send to: Lake Products. Dept. F. 149 Broadway. New York. N. Y.

IDEAL Gift. Beautiful Florida cypress lamp. $4.00 complete except shade. Craft-Mart. 316-P West Oakwood. Bucyrus. Ohio.

STEREO Special: Camera, Viewer, Slidemounts. Complete Outfit $20.00—Guaranteed—Easy to Operate. Keys Stereo Products. 3823 East Seventh. Long Beach 4. Calif.

REAL Western Cowboy belt for Junior. State size. $1.50. Kenlee Leathers. 2609 Canterbury Road. Baltimore 14. Maryland.

250 8½x11 LETTERHEADS $2.50 postpaid. Weeks. 342 Woodycrest. Nashville 11. Tennessee.

CRASH Helmet durable rubberized plastic sponge-rubber lining leather chinstrap adjustable for perfect fit, only $3.95. no C.O.D. Wal-Mar Products Co., Dept. M-26. 10023 So. St. Lawrence Avenue. Chicago 28. Illinois.

TAKE Third dimension (Stereo) Pictures with our Parallel Bar using any 35MM Camera. Cost of Bar $4.95. Stereo Viewer $9.95. Radex Stereo Company 179 N. Vista Street. Los Angeles 36. Calif.

BEAUTIFUL Ties, hand sewed only $2.00 each, 3 for $5.00. Ties. 705 Charlotte. Detroit. Michigan.

MOLDS: Handled and Hinged for Fishermen to make their own Sinkers, Jigs, Squids and Casting or Spinning Lures. Entertaining and profitable. 400 sizes and styles from $2.95 up. Special molds made to order. Free catalog. Sweet's Molds. Tonawanda 3. New York.

REVOLUTIONARY New Lift Exercisor —Stretch-A-Wate. Lifts Like Barbells. Fraction cost barbells. Free booklet. Stretch-A-Wate Co., Sappington, (St. Louis, Missouri.)

U. S. Unused 3c commemoratives 25 for $1.00. Jancowski. 3588 Frederick Street. Detroit 11. Michigan.

THRILLING Gift for stamp collectors. 12 different gorgeous sets, unusual stamps only $1.00 Regular $2.50 value. Money back if not delighted. Beaver Stamp Company. Peterborough. Canada.

MAIL Order World will get you started in a business at home by mail. Chock full of plans, ideas, advice. Long established. Single copy 25c. 6 months $1.00. Edwin Dornbush, Box 343. Woodstock. Illinois.

93 "ORIGINAL Idea" Jig Saw patterns $1.00. Professional drawing, quality printing. Full size shelves, toys, lawn ornaments, novelties. Walker Studio. PS12. 4343 Lindell. St. Louis 8. Mo.

SMALLEST cigarette lighter in the world, size of postage stamp. Only $1.00. Wicket. 13534 Woodward. Detroit. Mich.

HOLLYWOOD Brown Derby Cookbook. For you and your gift list. Postpaid $3.00. Willard's. Canoga Park. Calif.

XMAS Special Ball-Pen with 100 double edge razor blades $1.00. Guaranteed. Payne. 5426 5th Avenue. Los Angeles 43. Calif.

$1—PACKAGE of 7 tricks. Lists free. Paul Flayer Products. 38P Ward Plaza. W. Englewood. New Jersey.

THRILLING Gifts Supreme! Men, boys (women too) love Binoculars for sport and trips, microscopes for indoor entertainment; telescopes for fun, view homes, sky-hobbies. Finest pocket binoculars $17.50. popular 7x35—$49.50. Add 20% Fed. Binocular tax. Microscopes $4.95, $14.95. Big viewing telescope $75. Powerful sky-land telescope $125. Pocket telescope $6.95. Bargains galore. Huge selections. Postpaid. Full 30-day satisfaction guarantee. Free literature. Giftwise of America. Box 704-B. Santa Barbara. Calif.

ANTIQUE auto portraits, hand painted 8x10, Stutz or Ford $5.00 each. Richard Yates Studios. Box 263. Linwood. N. J.

ELECTRIC Shaver A.C. Current Guaranteed. Prepaid. $4.95. E&S Sales Co., 148-R Osborne Terrace. Newark. New Jersey.

"T" SHIRTS. 2 for $1.00. Buy Direct. Wilson Company, 71 Prospect. Paterson. 1. New Jersey.

10.000 FORMULAS, Trade Secrets. 867 pages. $3.50. Wilson, 506 Lyon, Grand Rapids. Michigan.

CHRISTMAS Gifts For Junior "Supertone" Crystal Radio $3.00 postpaid. Rotary printing press really prints $4.00 postpaid. Bridges Specialties, 2759 Primrose. Ft. Worth. Texas.

SAVE up to 50% on Xmas gifts, many other articles. Write United. Box 87. Detroit 2. Michigan.

LETTERS reairmailed from Havana $1.00. Jose Rabade. Apartado 3404. Havana. Cuba.

ATTRACTIVE. Novel. Treasure Map, in colors, one dollar. Treasure. Elmwood Box 161. Providence 7. Rhode Island.



Copyrighted material

# POPULAR SCIENCE OPPORTUNITIES

NEW 16MM sound Christmas Movies. Waverly, 5707 So. Christiana, Chicago 29.

UNBEATABLE! Over 100 different with triangles, Liberia, Tangier, Morocco, etc., Free with approvals. Reeve, 576-A Crawford, Windsor, Ont., Canada.

AMAZING precision map measure tells accurate distance on straight or curved lines. For motorists, fliers, surveyors, etc. Fits pocket or watch chain. $2.00 postpaid with leather case. A. W. Jacobus, Box 223B, Dunellen, New Jersey.

CAMERAS, Binoculars, Telescopes, Microscopes, Lionel trains. Inquiries answered promptly. Crestwood Wholesale Distributors, 182 Broadway, New York City 38.

TABLE Saw—Metal construction, roller bearings, blade, 2" cut, complete $10.95. Satisfaction Guaranteed, write: John Beckwith, Route 1, Box 642K, Fairfax, Va.

PRINTING—Stationery, envelopes, greeting cards, labels. Free catalog, samples. Wholesale prices. Dealers wanted. Sutton Printing, Box 853-X, Waycross, Georgia.

500 ADDRESS Labels $1.00 postpaid. Agents Prospering! Labelart, Topsham, Maine.

MOTORISTS! A New Tested and Proven Gas Saver only 25c. Ganus Enterprises, 1815-C Fairview Ave., Augusta, Georgia.

LEATHERCRAFT: Tanned Deerskins. Season's first shooting. Full skins, Fawns $2.95, Does $3.95, Bucks $4.95. ½ skins, ½ price. Worth triple. Limited supply. First come, first served. A. Frank, 45 Vesey, New York City 7.

CYCLE-Jet Makes bikes look, sound like motorcycles. Next best thing to a motor. Installed without removing wheel; steel, aluminum: simulates twin-cylinder engine with exhaust manifold, tail-pipe. Now, only $3.00 check or money-order. Hurry! Supply limited. Cycle-Jet, Tarrytown, New York.

PERSONALIZED Stationery—100 sheets and 50 envelopes, imprinted with name and address in blue ink. $1.00 postpaid. Ashmont Stationery Co., Box 162, Highland Station, Springfield, Mass.

MODEL Autos with electromatic drive. Catalog 25c. Model Autos, Box 133, Hemingway, South Carolina.

PERSONALIZED—Aluminum 3x5 File, Red or White enameled, 100 ruled cards, Alphabetical or Recipe index. Your name engraved on attached Gold plate. $3.00 postpaid. John Roberts, Farmington 30, Mo.

CONVERT Your bench jointer to quick change thickness planer. Plans $2.50. Construction kit and plans $14.50. Boat construction book 50c postpaid. Germain Boat Company, West Saginaw 1, Mich.

UNIQUE gift for lyric-writing friends. 38 page book of rhyming words. $1.00. Looks more. Not price marked. Broadway Song Service, Suite 301-S-12, 1650 Broadway, New York City.

COLLECTORS. Antique autos completely assembled handpainted ⅜ scale $3.00 up Stutz, Stanley, Packard, Cadillac. Mercer's Modelcraft, 30 John, Levittown, N.Y.

## 1 AUTOMOBILES & MIDGET CARS

SAVE—California Custom Accessories headquarters. Buy direct from original designers. Chrome dash panels, electric push button door-trunk conversions, fender skirts, dual mufflers, lowering kits, speed-dress up equipment. 40 page catalog. Hundreds of photos—25c. Eastern Auto, 3319D South Grand, Los Angeles 7, Calif.

POWERCAR Junior—Real Children's Auto! See details under "Motorcycles-Bicycles."

USE auto starter and battery. Convert child's car to electric. Plans $1.50. Weldomatic, Palm St., N. Providence, R. I.

FREE Motor Magazines; Automobile Literature, old, new and foreign; glossy photos, dealer books, shop manuals—offered with non-profit organization. Write today; get on free mailing list. Auto Maniacs, Inc., Stockbridge, Michigan.

"HOW to buy speed equipment without money." No selling. Information free. Newhouse Automotive Industries, Los Angeles 22.

MAKE, repair your own auto body. Polyester-Fiberglas. Catalog — 10c. Airmailed—35c. Gem-O'-Lite, Box 6861P, North Hollywood, California.

MOTORISTS—Alcohol-water injection increases performance up to 25%. Automatic unit only $5.95. Free literature. Vaporizer Co., Box 7033-S, Los Angeles 37, Calif.

HELP Make and Market new Carburetor. "Zip plus Mileage". 17 parts, 3 move. No Choke, jets, idling system or accelerating pump. J. R. Fish, Daytona Beach M4, Florida.

BUY racing heads, dual manifolds. Hot coils, etc., without money. Information free. Newhouse Automotive Industries, Los Angeles 22.

HERE It Is! The buy of a lifetime for any Car Owner, Dealer or Mechanic! "Automobile Engineering," a huge, 4-volume set totaling 2,804 pages, compiled by 11 foremost automotive engineers, published by a famous publisher and covering all phases of car design, operation, servicing and repair! Packed with basic information, photos, diagrams, charts, this encyclopedia of car knowledge stands half a foot wide on your bookshelf! It will be your ultimate authority on clutches, brakes, pistons, axles, fuel systems, wiring diagrams, 1,001 engine kinks, plus all other parts in all leading models! This immense, 4-volume treasury of money-saving facts retails at $24.80 a set. By special publisher's agreement, Popular Science can offer you the same set at fantastic bargain price of only $9.98! Just a few sets available, so act at once. Rush only $9.98 for the best buy in books ever! Popular Science Monthly, Dept. 1252-C, 353-4th Avenue, New York 10, N. Y.

## 2 AUTO SUPPLIES & EQUIPMENT

1953 EDITION. It's New! It's Different! Get world's largest Auto Accessory & Parts Catalog and save money. 100 pages. Over 50,000 items, including Hollywood Accessories, Hi-Speed Equipment, Rebuilt Engines, all parts and accessories for all cars and trucks. We have that Hard-To-Get part! Jam packed with bargains. Completely illustrated. Send 50c (refundable). J. C. Whitney, 1919-T Archer, Chicago 16.

LACHAPELLE'S Treatment. Cuban Distribution, Luis Izaguirre, San Carlos 178, Cienfuegos.

NEW and used guaranteed parts for civilian and Army cars and trucks. Largest stock in America. Mail orders. Pioneer Auto & Truck Parts Company, 788 W. 13th Avenue, Denver, Colorado.

BRUSH Plating Outfits connect to a battery. No tanks or shop required. Free particulars. Gunmetal Co., Ave. K, Decatur, Illinois.

GM71 Discarded injector parts wanted. Hogen, 7120 Carnegie, Cleveland, Ohio.

TRANSMISSIONS—We sell reconditioned guaranteed transmissions for all cars—$24.00. Auto Transmission Co., Dept. A, 5805 Kingsway Pl., Brooklyn 34, N. Y.

HYDRAULIC jack repair kits. Repair your own. Send for prices. Jack Parts Company, 2000A South Claiborne, New Orleans, Louisiana.

NOW adjust your distributor point-gap with motor running! Special adjusting wrench with simple instructions $1.00. Fords, Mercurys '49-'52. Patent-Crafts, 1803 Kenilworth, Berwyn, Illinois.

LACHAPELLE'S Treatment. Agents distribution, warehouse. Dillon, Box 323, Bridgeport, Ohio.

MERRY Christmas with an Autotray—Clamps on lower flange of dashboard—swings out of way—tray 6x12. Chrome $5.45—stainless steel $4.45—baked enamel (hammerloid gray) $3.45. Satisfaction guaranteed. Send check or money order. The Gift Shop, Box 703, Indianapolis, Ind.

HAND Brake Warning Lite complete with flasher. Fits all cars. Saves brakes, clutch, and gas. $3.95 postpaid. Daron Products Company, Box 45, North Quincy, Mass.

HI-Compression Heads $18.95 up. Most Cars. State Model. Auto Parts Service, West Salem 3, Ohio.

FOR Cars, trucks, trailers, with dull or faded finish. Not wax or polish, makes car look like new, protects finish. Just rub on. Ingredients can be purchased anywhere for less than $1.00, formula $1.00. Adams, 726 S. McArthur, Macomb, Ill.

LACHAPELLE'S Treatment. Canadian distribution. Master, Box 3, Station C, Hamilton, Ontario.

INCREASE! Gasoline mileage Three to Five more miles per gallon. Guaranteed Gasoline Vaporizer, also Increases Power. Easier starting. $3.50. Turb-O-Vane, Stockton, Calif.

CLEAN ice, sleet, snow from windshields. Cannot harm windshield. $1.25 postpaid. J. J. Virag, 480-S Spruce Street, Bridgeport 5, Conn.

1953 NEW whitewall tire cleaner. No scrubbing! No brushes! Spray-on, Sponge-off! That's all! Terrific . . . $1.00 complete. Box 166, Rochester 1 New York.

CAR burning oil? Losing compression? Try Clifford's Compression Seal. $2 Postpaid. Clifford's, 1329 Seventh, Aurora, Ill.

NEVER Change Your Oil! Full details free. Thousands of users. You'll be amazed! Dept. TH, Henderize, Inc., 5667 Freeport Blvd., Sacramento, California.

SEND for Free Life Membership Card. Economy Methods. "Water Burners of America." La Verne, California.

ELECTROPLATE autoparts, novelties, mirrors. Easy, inexpensive home processes. Free booklet. Tyco Metals, Box 13231-FC, Houston 19, Texas.

AMAZING new automatic safety starter switch. Start car by shifting into neutral when ignition key is on. Most adaptable to cars with automatic transmission. Anyone can install in a few minutes. Fully patented. Send $9.95 to Automo Corporation, 1840 N. Michigan, Saginaw, Michigan.

ILLUMINATE your powerglide or dynaflow dial, information free. Gaiser, Box 25B, Kokomo, Indiana.

SPEED equipment from the World's largest firm. 25c for huge catalogue. Newhouse Automotive Industries, Los Angeles 22.

"SAVE 50%—Speed Equipment, Hollywood Mufflers, Duals, Manifolds, Cams, Chrome Accessories! "Souping Manual—Catalogue" 25c (Circular Free). Almquist Engineering, Milford 6z, Pennsylvania.

CHEVROLET Owners: Stop tappet noise with Kaye Tappet Silencers. Quality product. Easy to install. Money back guarantee. Complete set $5.95 Postpaid. Kaye Products, 1321C So. Layton Blvd., Milwaukee 15, Wisconsin.

OIL-Vuer. Vital Link between oil filter and motor. Annealed Glass Dome cuts oil inspection to seconds. Easily attached to all filters with external lines. Thousands in use. $4.95 postpaid or send $1.00, balance C.O.D. Guaranteed. Rogers Automotive Supply Company, Box 23, Station C., Pasadena, California.

LACHAPELLE'S Treatment. (Patented.) For a better motor for $3.00. Free data. Ferns Products, 8120-D Walnut Dr., Los Angeles 1, Calif.

MOTORIST save gasoline by Vacu-mating overrich mixtures. Fits all cars. For Free particulars write Vacumatic, Dept. 1967, Wauwatosa, Wisconsin.

LIQUID plastic chrome protector 8 ounces. $1.00. Box 7213, Pittsburgh 13, Pennsylvania.

TURBO-Heaterizer for cars, aircraft principle. Guaranteed more power, gas mileage, quicker starting. $2.95. Piston Seal. Stops oil burning, restores compression. $1.98. Run car with empty gas tank, clogged line, faulty fuel pump. Install gravity feed. $2.95. Give make and year. Check, money order. Automotive Improvement, 7208—11th Avenue, Brooklyn 28, New York.

CARS, trucks, boats. Cut gasoline consumption by adjusting Hi-Speed Jet. Use Hi-speed metering adjustment needle, $1.95 each. Dual carburetors use two.—Spark intensifiers, mercury tipped $1.95—Use cheaper gas, with better performance. Use our Spark Plug Adapters. 10MM 30c—14-18MM 35c—7/8 40c each. Send specifications of car, carburetor with M.O. Siegmund, 49 Humboldt, Newark, New Jersey.



Copyrighted material

# POPULAR SCIENCE OPPORTUNITIES

AUTOMOTIVE Tool Salesmen get our catalog. Popular tools for body shop, glass, trim mechanics. Douglass Tools, 5251 Pattison, St. Louis 10, Mo.

## 3 AUTO TRAILERS

BUILD your own trailer! Plans for all kinds. Illustrated catalog 10c. Jim Dandy, 125-S Wausau, Wisconsin.

## 4 MOTORCYCLES, BICYCLES AND SUPPLIES

RECONDITIONED motorcycles and motors. Chromium accessories. Complete stock Indian parts. Expert rebuilding. Fast service. Indian Motorcycle Sales, Kansas City 27, Mo.

WHIZZER twin motor $7; Briggs $5; Harley single motor $10, Harley twin motor $10; Midget car chassis $65. Four airplane tires $3. (Mailorder only). Send 25c for catalogue Number Fifty listing the above and hundreds of bargains in new and used motorscooters, midget cars, motors, parts, plans for homebuilders, etc. (35c by first class mail). Midget Motors Directory, Athens, Ohio.

POWERCAR Junior—Real Children's Electric Auto . . . Plenty of power for hills, towing wagons, etc. Catalog free. Mystic River Sales, Dept. Q-12, Mystic, Conn.

WHIZZER $20; Servicycle (good tires) $20; Motorbike conversion kit $25; Cushman motorscooter $25; Harley twin $25. Rush 25c (35c first class mail) for special circular #953 listing many other amazing bargains in motors, midget cars, motorscooters, motorbikes, etc. Associated, Box 1764-CS, Toledo, Ohio.

"BUZZZZ" Magazine. Describes, Illustrates Worldwide Motorcycle. $2.00 year, Sample 20c. 5424-B Sawyer, Chicago 25.

REBUILT Gasoline Engines. $17.00 to $37.00. Cauffiel Motor Industries, Temperance, Michigan.

## 5 AVIATION

AVIATION surplus catalogue sent for stamp. Ort, Thomasville 2, Penna.

PROPELLERS, plans, supplies, for snow sleighs-air boats. Catalog 20c. Banks-Maxwell, Box 3301G, Ft. Worth, Texas.

## 6 BATTERIES, GENERATORS, ETC.

EDISON Nickle odorless storage batteries. 12 to 600 ampere hour. Any voltage. Long guarantee. Literature. Hawley Smith Co., Croton Falls 2, New York.

## 7 ELECTRICAL SUPPLIES & EQUIPMENT

LAMPS—25c brings bargain parts catalog containing instructions for electrifying oil lamps, vases, etc. Gyro Lamps, 5402B Clark, Chicago 40.

FREE—War Surplus Catalog—Bargains Galore. Welders, Motors, Generators, Hydraulics, Pumps. Kits for assembling your own, other items. Save. LeJay Company, Minneapolis, Minnesota.

LAMP Supplies — Wholesale — any amounts. Prompt shipment on all parts for repairing and building lamps. Illustrated catalog 15c. Brown Lamp Co., No. 501, Wellston Sta., St. Louis 12, Missouri.

200 AMP 28 Volt. D.C. Generator $18.50; ½" Electric Drills, Geared chuck $31.50; Powerful Aircraft Actuators 24 V. $7.50. All Merchandise New and Used. Satisfaction Guaranted. F.O.B. Card's Warehouse, 6221 Edgewood Dr., Niagara Falls, N. Y.

200-300 AMP. 28 Volt Aircraft D.C. Generator serviceable $14.49. Catalogue dime. Ort, Thomasville 3, Pennsylvania.

## 8 WELDING, SOLDERING

A.C. Welders, Four sizes, Lowest Prices. Free Literature. Holgerson's Service, Canton, Kansas.

## 9 MACHINERY, TOOL SUPPLIES, ETC.

POWER Saw for your drill $10.95. Particulars free. Glirest, 145 East Philadelphia, Youngstown 7, Ohio.

MOTOR driven rotary Hone sharpens all Keen Edge tools. A must for all shops. Immediate delivery. Moore Industries, Fredonia, Pennsylvania.

10" BANDSAWS—Special $29.99. Investigate! Free literature. American, 3026 Thomas, Minneapolis 11, Minnesota.

RUN your own shop and make $2-$3 per hour. Our machines will make money for you. Screw-cutting gap lathe, 22"x12', opens to 40"x16'—$1830. 20"x8' quick change—$1380. 18"x10' quick change—$1420. 20"x8' loose change gears—$380. 14"x6'—$280. 20" drill—$180. 16" shaper—$480. Universal milling machine—$340. 28" drill and jig-borer—$460. Bolt threader—$180. 26"x12' lathe—$640. Universal shaper 16"—$620. Vertical miller table 16"x30"—$240. Money back if you are not satisfied. Conversion Parts Co., 277 Adams St., Boston 22, Massachusetts.

FREE! Complete catalogs of precision tools for any job. Big stocks—famous brands: Lufkin, Starrett, Brown & Sharpe. Immediate delivery. Wide selection. Write for your copy today! Mid-City Hardware & Supply Co., Dept. PS, 318 South Halsted Street, Chicago 6, Illinois.

POWER tools, equipment wholesale prices. Free bulletin. Homecrafters Cooperative, Grand Rapids 6, Michigan.

MACHINE Shop Men and Handy Men! Save over 60% on the most authoritative set of home-instruction books ever published anywhere on machine shop practice . . . The Modern Shop Practice Library. The famous publishers issued this magnificent 8-Volume set for which thousands eagerly paid $34.80! Now Popular Science makes the very same library yours for only $11.98! Contains world's most complete coverage of machine shop knowledge. Over 4,000 pages of vital information, 3,848 detailed illustrations, plus 167 tables! Written simply, clearly by 41 of nation's top-ranking experts. All you need to know about tool making, pattern making, foundry work, forging, mechanical drawing, blueprint reading, and hundreds of other skills. Each skill worth the price of the set alone! Each volume indexed. Beautiful, lifetime bindings. Never before in U. S. history has there been such a need for skilled machine shop men. You can make more money by claiming Your complete 14 lb. "Modern Shop Practice Library" now! You run no risk . . . money back if not fully delighted. Remember, you pay—not the $34.80 paid by thousands of satisfied men, but the low price of just $11.98. Send remittance and order Today to Dept. 1252-C, Popular Science, 353-4th Ave., New York 10, N. Y.

## 10 ENGINES, MOTORS, ETC.

WINDING Data, listing 225 motors, single and three phase $1.00. Motor Data, Box 7631, Kansas City 3, Mo.

ALTERNATING current Generators 3000 watt $95. 5000 $135. Motors ½ horse $15. ¾ $22. 1 $35. Butler, 1885 Milwaukee, Chicago 47.

REBUILT Gasoline Engines. $17.00 to $37.00. Cauffiel Motor Industries, Temperance, Michigan.

EARN Big Money! Become an expert in Diesel Engineering. Think of it, you can now claim The Complete Diesel Engineering Library through a special Popular Science offer that knocks off 62% of the original cost! Thousands eagerly paid $29.80 for this magnificent 6-Volume Set, the most complete library of its kind. You get it for only $9.98! Over 30 Diesel experts and top-ranking technicians pooled their high-paid knowledge and experience to create the world's most exhaustive library on Diesel engineering. Here's your complete treasury of fact and illustration on the Construction, Operation and Maintenance of Heavy-Duty and High-Speed Diesel Engines. You get all allied instruction in amazingly easy-to-follow style . . . practical mathematics, slide rule, principles of electricity, construction, operation and maintenance of motors, Diesel electric plants, mechanical and electrical equipment for Diesel locomotives; thermodynamics, theory and design of Diesel engines and a great deal more. Profusely illustrated, jammed with tables, charts, show-how diagrams. Each volume sturdily bound, fully indexed. Start up the road to higher earnings Today. Claim your Diesel Engineering Library Today, remit not $29.80, but only $9.98 to Dept. 1292-C, Popular Science, 353-4th Avenue, New York 10, N. Y.

## 11 BOATS, OUTBOARD MOTORS

FULL size, cut to shape boat patterns, blueprints, 7½-38 feet. Illustrated "Build a Boat" catalog 25c (coin). "How to Build Boats" book $1.00. Cleveland Boat Blueprint Co., Dept. A-77, Cleveland 13, Ohio.

NEW, used, rebuilt marine motors. Marine conversions, fittings. Free Catalog. Stokes Marine Supply, Dept. 23, Coldwater, Mich.

OUTBOARD Motor Parts—New—Used for all makes. Send stamp for price quotation, listing parts needed. Outboard Motor Mart, Inc., 229D State Street, Boston, Massachusetts.

SAVE 2/3 Cost. Assemble your own boat. We furnish parts. No experience necessary. Rowboats, Cruisers. Illustrated Catalog 25c. Midwest Boat Company, Menomonee Falls 1, Wisconsin.

MARINE conversions for Ford and Jeep engines. Catalog 10c. Lehman Manufacturing Co., 972A Broad St., Newark 2, N. J.

NYLON Rope, AAF Charts, Compasses, Marine Items. Catalog 25c. Sailors Surplus, Orangeburg 11, New York.

CURE that leaking boat with Fiberglas-Plastic covering. Ends caulking and painting. Nationally approved process. Easily applied, complete instructions. Industrial Plastics, 3807 Harrison Street, Oakland 11, California.

CONVERT Fords and Jeep to 100% marine engines with Osco's world famous Convo-Kits. Deluxe catalogue 25c (coin). Oscomotors, 3627F Lawrence, Philadelphia 40, Penna.

PERMANENT protection for your boat. Apply Polyester-Fiberglas coating. Catalog—10c. Airmailed—35c. Gem-O'-Lite, Box 68610, North Hollywood, California.

BUILD Beautiful Fiberglas-Plastic Boats without using molds. New patented method. Write Speedcraft, 2450 Emerson, off Square Lake Road, Pontiac, Michigan.

PLANS: Inboard-outboard runabouts, cruisers, sail. Wood, plywood, welded steel. Advise requirements. John B. Clark, N.A., 329 Kenmore, Bay Village, Ohio.

## 12 BODY-BUILDING COURSES, JIU JITSU & ATHLETIC EQUIPMENT

100 TRICK Knockouts for self defense. $1. 1c each. Lincoln, 529 Main, Evanston 2, Illinois.

GAIN Weight, Muscle fast! Proven method. Confidential information. Cambria, Box 26-D, Cambria Heights 11, N. Y.

BUILD powerful arms, chest, shoulders. 22 exercises. $1. Fonsad Studio, Box 601C, 1100 Market Street, Wilmington 99, Del.

BUILD your own Barbells $3. Materials obtainable anywhere. Complete instructions $3—Body building course free. T. T. Barbells, Box 631, Cleveland 7, Ohio.

BARBELLS, Dumbbells, Exercise equipment. Courses. Free booklet. Good Barbell Co., Reading, Penna.

## 13 TAXIDERMY

TAXIDERMY Supplies, Everything! Books, Instructions. Catalog 10c. Vandyke's, Wessington Springs 13, S. Dakota.

## 14 FIELD GLASSES, TELESCOPES

GIANT 100 power telescope easily made for pleasure or profit. Instructions, 5 lenses, wholesale list, profit suggestions $3.00. Carl Jamer, Manorville 5, N. Y.

WAR Surplus Bargains. Binoculars, Telescopes, Sextants. Millions of Lenses, Prisms, Reticles, Eyepieces, Objectives, etc. Mail 10c for Big "Catalog CN." Send $1.00 for Stock CN-10-piece Lens Kit and Big Instruction Booklet. Edmund Scientific Corp., Barrington, New Jersey.

POWERFUL astronomical telescopes easily made. Perfect lenses and instructions; 100x $3.00; 100x and 200x $4.00; 100x, 200x and 400x $6.00. Full power, clear vision guaranteed. Instructions alone 10c. Suffolk Science Service, Riverhead, N. Y.

FREE illustrated Binocular Buyers Guide—inside facts about World Famous Models. How to Buy Direct. F-E Binocular Buyers Guide, Dept. 2, 2251 W. Pico Blvd., Los Angeles 6, Calif.



Copyrighted material

# POPULAR SCIENCE OPPORTUNITIES

BINOCULARS, telescopes, microscopes. Our 20th year of leadership in optical values. Bargain catalog free. Brownscope Co., 24 West 45th St., New York.

"FREE" Catalogue! Thousand war surplus optical bargains. Lenses. Prisms. Telescopes, Binoculars, etc. Send $1.00 for 10 Lens Hobbyist Set and Project booklet. G. Jaegers, 691 West Merrick Road, Lynbrook, New York.

SAVE: Free 36 page, 3 color binocular catalog. 60 different models. United Binoculars. (A-6516). 9043 S. Western, Chicago 20.

SAVE! Save! New Binoculars! Free Catalog. Free Book. "How To Select Binoculars." Write Today! Bushnell's, 43-P42 Green, Pasadena 1, Calif.

GIANT 100 power complete telescope and tripod. (10,000 area magnification). No upside down images. $10.00 f.o.b. factory. Carl Jamer, Manorville 5, New York.

MICROSCOPES—Slides—Sets; biology, nature, free literature. D&L Microslides, Box 14, Times Square 36, New York City.

BINOCULAR specialists, all makes repaired. Authorized Zeiss, Hensoldt dealer. Tele-Optics, 5514 Lawrence, Chicago 30.

CHRISTMAS Specials: Microscopes $3.95 up; telescopes $9.75 up; Binoculars, microscope and telescope supplies. Many other bargains. Free list. Nassau Optical Co., 9 W. Greenwich Ave., Roosevelt, L. I., N. Y.

REFLECTOR telescope kits—Precision eyepieces, Mirror cells, Diagonal holders, Tubing, other optical bargains. Free illustrated bulletins. Esco Products, 911 Willow Ave., Hoboken, New Jersey.

AMAZING prices, binoculars, telescopes, microscopes. Free trial. Folder, "Binocular Selecting" optical catalog free. Prentiss Importers, Mercury Bldg, West Los Angeles 25, California.

GIANT astronomical telescope complete with six ft. Tripod. 45X and 100X (10,000 area magnification) eyepieces and sun projector lens. Full power, clear vision guaranteed. $15.00 F.O.B. factory. Suffolk Science Service, Dept. TC, Riverhead, N.Y.

NEW 8x30 Binoculars with leather case. Guaranteed. $35.00 tax included. Send $5.00 with order. All sizes. Free prices. Joe's Binocular Sales, 4827 Second Blvd., Detroit 1, Michigan.

TELESCOPES, Microscopes, Binoculars, Books. Buy, Sell, Repair. Rasmussen-Reece, Amsterdam, New York.

BARGAINS, Binoculars, Microscopes, Telescopes for sky hobbies, view homes. Literature. Giftwise, Box 704-B, Santa Barbara, California.

POWERFUL telescopes easily made. Lenses, erector, focusing tube, instructions for making 40X, 100X, 200X and 400X telescope $6.00. Telescopic Cameras, Manorville 5, New York.

## 15 SPORTING GOODS, GUNS, FISHING TACKLE, ARCHERY, TRAPPING

120 PROFUSELY illustrated pages, antique pistols, swords, daggers, armor, etc. 50c. Robert Abels, PS860 Lexington Ave., New York 21.

SAVE on Gunsmithing, Jap Conversions, Scopes, Loading Tools. Catalog 10c. Cougar Arms Company, 587 Ferris Street, NW, Grand Rapids, Michigan.

5,000 BARGAINS, firearms, binoculars, war relics, catalog 50c. Smith Museum, Runnemede, N. J.

FISHERMEN—make your own sinkers with our molds. Free illustrated booklet. Reading Instrument Co., Box 78, Reading, Penna.

GUNS Galore! Westerns—Kentuckies—Winchesters—Mausers—Colts—Lugers. Big bargain antique—modern gun list, 25c. Quality gunsmithing. Ed Agramonte, 201 Warburton Ave., Yonkers 2A, New York.

FOREIGN Domestic Ammunition, 200 kinds knives, crossbows, rifles. Catalog 10c. Ashton, 1517 Gardner, Hollywood 48, California.

CUSTOM Gunsmithing, Restocking, Rebluing, Jap Conversions. E. M. Bryant, 1113 So. Lea, Roswell, New Mexico.

OVER 500 guns, modern, obsolete. List 10c coin. Ed Howe, 26 Main, Coopers Mills, Maine.

## 17 DOGS, BIRDS, HAMSTERS, RABBITS & PETS

MAKE Big Money! Raise Chinchilla Rabbits. Cash Markets Supplied. Write Today! Rockhill Ranch, Sellersville 16, Pa.

RAISE Mink: Free booklet, pen, plans, inside "secrets" feed care. Mink are money makers. Investigate today. Lawrence Molgard, Brigham City 13, Utah.

YOUNG Parrots—make fine talkers. Herb Miller, 1911-N, Lubbock, Texas.

700 BRED Mink booklet pen plans 20c. Lake Ontario Mink Ranch, Gravel Road, Webster, New York.

RAISE Guinea Pigs. Good markets. Free Booklet. Taylors, B426B, Hapeville, Ga.

DOG training collar and complete instructions $1.00. Artcraft, East Peoria, Ill.

BIG profits raising pet hamsters in garage or basement. Write for free information. Southern Hamstery, Box P685, Gaffney, S.C.

NATURALIST'S Catalog 10c. Chameleon 55c. Trio Hamsters $4.75. 200 Mealworms $1.00. Quivira Specialties, Topeka 10, Kansas.

GOLDEN Hamsters. Pedigree Stock. Breeders, Laboratory or Pet Stock Shipped express Anywhere. Price list free. Charles E. Bowser, Smoke Run, Pa. Dept. H.

## 18 FROG RAISING

"FROG Raising!" New book tells how. Illustrated literature free. Broel-A, 1035 Marlborough Detroit 15, Michigan.

COTTON-Tail rabbits, frogs, for sale. Vol Brashears, Berryville, Arkansas.

## 19 FARMS, OTHER REAL ESTATE

FARM Ranch Opportunities, favorable conditions, Washington, Minnesota, Montana, Idaho, Oregon, North Dakota. Literature, farm descriptions, specify which state. J. W. Haw, 120 Northern Pacific Railway, St Paul, Minnesota.

FLORIDA. New Lake County development adjoining Ocala National Forest. Best fishing, hunting. Safe from bombs. Nice homesites $245 at $10 monthly. Folder free. Winfree Vernor, DeLand, Florida.

STROUT Catalog Mailed Free! Farms, Homes, Businesses. 31 States. Coast-to-Coast, over 3400 bargains. World's Largest. Our 52nd year. Strout Realty, 255-ZB 4th Avenue, New York 10, N. Y.

FLORIDA—5 acres high dry land near beaches, raise fruits and vegetables. Only $495.00, $10.00 down, $10.00 month. Information write G. B. Potterfield, Owner, Union Bldg., Dept. P, Charleston, W. Va.

FLORIDA Highway Ranchos—$345. Pay $15 monthly. Most desirable, large Country Estates. High, dry and gently rolling, on Paved Highway. In famous Panama City Pleasure Resort Area. World's finest beaches. Beautiful lakes. Wonderful fishing, hunting. Grow fruits, berries, vegetables, flowers, Poultry. Cheap electricity. Ideal for happy, economical living in new, desirable Community. Fine investment. Write today for Free Booklet. Douglas Wood, Box 873, Houston, Texas.

MAKE Money In Texas. Get Yourself a fine Tract Now near Houston for only $245.00. Pay $10 cash and $10 monthly. Fastest growing city and Second Largest Seaport in U.S. Huge $100 Million Steel Plant. World's greatest Oil Producing, Refining, Chemical, Manufacturing and Shipping Center. Many are making phenomenal profits here and You can too. These beautiful Tracts located in Houston's desirable Southside Suburbs with All-Weather Streets, electricity, schools, bus service, etc. Insured Title. Write today for Maps, Pictures, full information Free. Baker Wood, Owner, Box 6223, Houston 6, Texas.

CALIFORNIA Ranch Lands. 50c to $5 acre minimum bid. Farm-ranch-hunt-fish-retire. 10c brings illustrated land catalog, outline maps. Tax Land Sales, Box 2350BX, Hollywood 28, Calif.

FIVE Acres & Independence; Book; "How To" Select, finance, manage, etc., small farms; Write for Free details. Landcraft, Box A218, Cole Camp, Missouri.

## 20 TREES, SHRUBS, ROOTS, HERBS

FRUIT Trees! Stark Bro's sensational new "Dwarfs." Also standard size exclusive patented, trade-marked varieties produce abundant, larger, better apples, peaches, pears. All fruit faster growing, quicker bearing. Also beautiful ornamental trees and shrubs. Get giant new Color-photo Catalog Free. Stark Bro's., Dept. 30063, Louisiana, Missouri.

## 21 POULTRY & SUPPLIES

POULTRY Farmers—Broiler Growers—Turkey Raisers read the new American Poultry Journal for latest ideas and greater profits. 12 months, 50c. Special offer, 4 years, $1.00. American Poultry Journal, 182 North Wabash, Chicago.

RAISE Turkeys the new way. Write for free information explaining how to make up to $3,000 in your own backyard. Address—National Turkey Institute, Dept. 57, Columbus, Kansas.

RAISE pheasants on the $100 week plan. Little capital and space can make you independent. Free details. Great Central Game Management System, Columbus 6, Kansas.

## 22 PROFITABLE OCCUPATIONS

DETECTIVES Earn Big Money. Excellent opportunity. Detective Particulars free. Write, Wagoner, P-125 West 86th, New York 24.

BE independent, be secure, have your own profitable business—earn $20.00 and more a day making beautiful, fast-selling lamps at home. No equipment needed. Illustrated course teaches you quickly. Course, parts catalog, wholesale price list—only $2. Gearon Co., Dept. 200-A12, 27 S. Desplaines, Chicago 6, Ill.

$40.00 WEEKLY. Made growing mushrooms. Fresh. Dried. Dominion Patent 331,583, free spawn. North American, 169Y Yonge, Toronto, Canada.

WANT A Diesel Job? New Opportunities to increase income. Higher Pay. More Money. We can help you Qualify. Tools. Shop method home training. Write today. Diesel, Tractor, Heavy Equipment Division, Interstate Training Service, Dept. 2N, Portland 13, Oregon.

"HOW to Make Money With Home Workshop" describes amazing methods used by hundreds of successful craftsmen. Tells what to make. How to sell workshop output spare time. Write at once for details. Craftsman, 115B12, Worth Street, New York City.

$10,800 PROFITS! Your own Mailorder Business! No Capital Risk! "Success Plan" (worth $2) Free! Write today! Treasury, 149 Storer, New Rochelle P-6, New York.

$5000 FROM half acre growing Ginseng, crop bought. Particulars 10c. Associated Growers, Sperling, Manitoba.

SEVERAL Mailorder Money Making Homework offers. Jenkins-PS, Lucasville, O.

BUY Wholesale thousands nationally advertised products at big discount. Sent free. "The Wholesale Plan." American Buyers' Service, 627-S Linden, Buffalo, N. Y.

START Small capital manufacturing. Complete story on how I netted $25,000.00 in fishing reels. Send $2.00 now to Clay Manufacturing Co., Northfield, Minn.

SOCIAL Security Handbook. Benefits explained. Complete information. $1 per copy. Informational Services, Box 911K, Paducah, Ky.

RAISE fishworms, easy, profitable, complete instructions 25c. Huffman's, Rives Junction, Michigan.

GROW Mushrooms. Cellar, shed, and outdoors. Spare, full time, year round. We pay $3.50 Lb. We paid Babbitt $4,165 in few weeks. Free Book. Washington Mushroom Ind., Dept. 101, 2954 Admiral Way, Seattle, Wash.

UP To $200 Weekly! Work home, start spare time, small capital. Free book "301 Unique, Successful Businesses" tells how. Deumant Publications, 85-T Deaumant, Kenmore 23 New York.



Copyrighted material

WANTED! Home Producers by Manufacturers in our Clearing House Service. Become a sub-contractor casting plastic products for these companies. Thousands of easy to make items required. Cash in at home, without previous experience. For details write Plastic Service, Dept. PS, East Boston 28, Mass.

RAISE Ginseng! Roots bring fortunes. Free Information. Fezler, Patchogue, N. Y.

FREE Book "505 Odd, Successful Businesses." Work home! Expect "Odd"! Pacific—37C, Oceanside, Calif.

SAIL Ho! Be a Merchant Seaman. Enjoy World Travel, big pay. Send Now for Free Information. Seaways, Box 1231, Baltimore 3, Maryland.

## 23 BOOKS & MAGAZINES

MAGAZINES (back dated)—foreign, domestic, arts. Books, booklets, subscriptions, etc. Catalog 10c, (refunded). Cicerone's, 86-22 Northern Blvd., Jackson Heights, N. Y.

BOOKHUNTERS! All Subjects. Send Wants! Jaher Book Service, 620-K East 178 Street, New York 57.

ATHEIST books. Catalogue free. Truth Seeker Co., 38 Park Row, New York 8.

FASCINATING Books. 24 Real Illustrated Humor Booklets $1.00. Foreign Art. Novelties. Illustrated Catalog 10c. Aladdin Book Co., 210-PS Fifth Avenue, New York 10.

WHY Things Happen. Troubled about personal misfortunes—unhappy world conditions? The inspiring book, "The Divine Providence", by Emanuel Swedenborg (1688-1772) will help answer your questions. 640 pages, 25c postpaid. The Swedenborg Foundation, Section 11, 51 East 42nd Street, New York City 17.

ADULT Books—Illustrated Comic Booklets. 20 for $1.00. All different. Free gift with each order. V. M. Rogers, Dept. PS, Box 14738, Cimarron Station, Los Angeles 18, California.

SPARETIME Profits Taking Subscriptions. All Magazines. Wholesale Catalog Free. Cassell Agency Westfield 1, N. J.

SEND $1.00 for ten used pocket books. P.O. Box 36, So. Oz. Pk., New York.

AMAZING New Adult Book Bargains. Send dime. Paul Vallon, 63 Perry, New York 14, New York.

ADULT books, Tricks, "Illustrated Comics" 10—$1.00. Free Gift. Catalogue 10c. Rothleder, "102SMB" Cathedral Station, New York 25.

CARTOON Booklets—Unusual! Different! 12—$1.00. Marshall, 4831-B Shafter, Oakland, California.

BACK-Date magazines. Specific issues; years. Arkell's Northridge, California.

IF you can think you can sing! Learn the secret in the Montell Vocal Technique, internationally adjudged the greatest book on singing ever written. Write Montell Foundation, 2567 S.W. Third St., Miami, Florida. C.O.D. $5.

SELF Unfoldment Books and Courses: "The Mysteries", Mysticism, Occultism, Yoga, Philosophy, Theosophy, Freemasonry. Catalog. Jordan's, 1130 Keller Avenue, Louisville 13, Kentucky.

BOOKHUNTERS! Scarce, unusual, miscellaneous books supplied. Atlantic Book Service, 2 Lawrence, Charlestown 29, Mass.

MINIATURE Locomotive, bi-monthly magazine about live steam model railroads—tells "how-to" build, pictures of engines, cars, track set-ups, club news. Exciting, educational family hobby. Send $3.00. Miniature Locomotive, Box 305-G, Reseda, Calif.

INTERESTING adult books—novelties—illustrated comic booklets 24—$1.00, catalogues 10c. Kogan, 1032PS Church Annex, New York 8.

JITSU, Boxing, Magic, Dancing 30c. Used books sale: 9 for $1.00, 20—$2.00. Literature Samples 30c. Persil, 436 N. Y. Ave., Brooklyn 25, New York.

WATCH Your Money in Mail Order! Send for further details, free. Maxted Book Agency, PS, Western Springs, Ill.

HERBERT A. Luft, 42-10 82nd Street, Elmhurst 73, New York. Educational, Scientific Books. Give Wants.

NATIONAL Geographic Magazines 1888-1952 Any Issue. Periodical Service, Box 465-PS, Wilmington, Delaware.

ADULT Book Bargains. Catalogue, Samples, 10c. Arkay, Box 2052, Los Angeles 53, Calif.

BOOKS—Booklets, Art, Humor, etc. Illustrated catalog 10c. Aladdin Book Co., 210-P Fifth Avenue, New York 10.

HOW-To-Do-It. Free catalog. Renta Book, 445-C West 34th, New York 1.

## 25 MAGIC TRICKS, PUZZLES, ETC.

MAGICIANS', Gamblers' secrets exposed. Cards, Dice, Punchboards, Slot Machine. Catalog 10c. Book Co., Box 671, St. Louis 1, Mo.

FREE trick and large illustrated catalog—35c. Lerro's Magic, 8111 Fifth Avenue, Brooklyn 9, N. Y.

NO 29 Edition Catalog 500 Tricks now ready. Send 10c for your copy, containing latest in good magic for pocket, parlor, stage. Douglas Magicland, Dept. 2, Dallas, Texas.

200 ELECTRIC stunts, 110 volts, $1.00. Cutting Sons, Los Altos, California.

MAGIC—Jokes. Big Magician's catalog 10c. Top Hat, 529X Main, Evanston, Ill.

DOLLARS Worth Magic Tricks, Puzzles, only 50c. 703 Venable, Baltimore 18, Md.

512-PAGE catalogue of 2500 tricks, pocket, parlor, stage. World's Finest Magic. Send $2.00 for catalogue (refunded first $8.00 order). Kanter's, S-1311 Walnut, Philadelphia 7.

VENTRILOQUIST Dummy—34" cowboy or dude, complete course, comedy skit. Only $14.95. Send 25c for pictures and details. Stagecraft, Box 467, Roanoke, Va.

FREE Magic Trick with illustrated catalog 25c. Maj Magic Products, 23 Friends, Westbury, New York.

MAGICIAN'S illustrated catalog and free trick 35c. Terry's Magic Studio, 6606 Duryea Court, Brooklyn 19, New York.

## 26 COIN COLLECTING

GET Profit and Pleasure in collecting old coins. Send 10c for 56-page illustrated coin catalog. You'll be delighted with it. Send for it now. B. Max Mehl, 374 Mehl Building, Fort Worth, Texas. Largest rare coin establishment in U. S. Established 51 years.

FREE! Foreign coin, banknote and Coin Collectors' Illustrated Catalog to approval service applicants. Send 3c postage. Tatham Coin Co., Springfield-50, Mass.

OLD Money Wanted. Will pay $100.00 for 1894 Dime, S. Mint, $50.00 for 1913 Liberty Head Nickel (not Buffalo). Big premiums paid for all rare coins. Send 4c for Large Coin Folder. May mean much profit to you. Numismatic Co., Dept. 30, Fort Worth, Texas.

CONFEDERATE 1862 $100 bill, fine condition only $1.00. Orleans Coin Shop, 517 Baronne, New Orleans 12, Louisiana.

FREE! Coin Collector's new magazine and wooden nickel. Lawrence Brothers, Anamosa, Iowa.

SET nine Japanese invasion notes for U. S. $2.00. Illustrated coin catalogue 25c. Shultz, Salt Lake 10, Utah.

WHAT Are your coins worth? Amazing Fell's new 1952 United States coin book. Everything on every single coin minted—Worth, value, how to sell, speculating, investment; other valuable facts. Clothbound. 150 illustrations. Send no money. Pay postman only $1.50 (plus postage) or $1.50 postpaid (refundable). Order now! Fell Publishers, 386-S7 4th Ave., New York City 16.

COIN Magazine, 100 pages. Sample Copy 30c. Numismatic, 7320 Milwaukee, Chicago 31.

LARGE cents, 2c pieces, 3c pieces, white Indian cents, Flying Eagle cents, each 50c. All five $2.00. Sayers, 1000 E. Unaka, Johnson City, Tennessee.

20 DIFFERENT indianheads $1.00. Amazing grab-bag offer $3.50. Fairway Company, Rye, New York.

CASH! Coin, Stamp—Buyer. Catalogues 30c. R-1119 Chestnut, Saginaw, W. S., Michigan.

## 28 STAMP COLLECTING

FREE—Illustrated Catalog! Kenmore, Milford C-58, New Hampshire.

AMAZING Offer! 200 United States stamps—including commemoratives, airmails, high denominations to $5.00—Only 10c to Approval Applicants!! Illustrated Bargain Lists free. Mystic Stamp Co., Dept. 55, Camden, New York.

FREE—Complete set of Famous Americans, Flags, Parks and Presidentials to approval buyers. Send 3c for 15 of the above stamps plus full particulars. Triboro Stamp Company, 145 Nassau Street, Dept. 212, New York 28, N. Y.

1,000 UNIQUE Colorful attractive mounted stamps 1c-2c each. Rushed. Niagara Stamp Co., Niagara-on-the-Lake 72, Canada.

300 STAMPS For Only 10c! This mammoth value includes Airmails, Pictorials; stamps from strange countries cataloguing up to 25c each!! Also approvals. Mystic Stamp Company, Camden 55, New York.

POLAR Bear Triangle; Giant George Washington, Six Colored Ecuador, Arctic Triangle, first American commemorative, Corsica, Devils Island, others. Everything free with approvals. Capital Stamps, Little Rock 10, Ark.

FREE Stamp Collection:—100 different stamps from Europe, Africa, Asia, Scandinavia, Balkans, etc., 3c to approval applicants. Tatham Stamp Co., Springfield 50, Massachusetts.

200 EXOTIC Japan Stamps—10c! Kenmore, Milford K-58, New Hampshire.

U. S. Army & Navy Heroes on Stamps; 10c with United States approvals. Locust, Box 305-A, Harmon-On-Hudson, N. Y.

200 DIFFERENT, including Roosevelt triangle, 5c to approval applicants. S. Avalon Stamp Co., Springfield, Mass.

FREE, Scott's International Album. Other big premiums. Full particulars with approvals. Raymax, 68-X Nassau St., New York 38.

FLAG Stamp—Free with hygrade U. S. approvals. Weniggman's, 1933 Patterson, Chicago 13.

ALBUM! Capacity over 1000 stamps! Only 10c! Stampmart, Hartford 1, Conn.

312 MIXED U. S. only 10c to "Gold Nugget" approval applicants! Nothing like them. Kessel's, Folsom, California.

307 ALL Different—Only 15c! Beautiful collection: Commemoratives, Triangles, High Values, Bicolored Stamps, etc. Garcelon, Calais 418, Maine.

NUDES Set; Colorful approvals—10c! Atlas, 2830-P Eisenhower, Racine, Wisc.

77 DIFFERENT United States—25c. Approvals. Utechts, 1143-A North Keeler, Chicago 51.

WOW! 203 All Different Germany 10c! Zeppelins, Semipostals, Airmails, High Values, etc. to new customers. Jamestown Stamp, Jamestown 509, New York.

FREE "Stamp Finder." Tells country to which any stamp belongs. 32 pages profusely illustrated. Garcelon, Calais 19, Me.

WE give you—mammoth international albums, Scott's catalogues, hinges, complete accessories, when you buy our wonderful foreign approvals. Don't write unless you intend to buy. But don't buy elsewhere without comparing our more generous offers. Bargain Stamps, Santa Ana, California.

327 DIFFERENT Stamps 25c! Including Early Canada, Newfoundland, British Colonies, Vatican, Red Russia, Hitler Heads, Indian States, Animals, Airmails, French Colonies, rarities, unusuals. Every stamp different. Rare bargain only 25c with our Bargain Approvals. Money back guarantee. Niagara Stamp Co., Niagara-on-the-Lake 62, Canada.

VALUABLE Airmail book plus gorgeous world-wide airmail collection 10c. Includes $10,000 stamp, zeppelin, scarce triangle, many others with beautifully illustrated book, only 10c with choice approvals and bargain lists. Jamestown Stamp Co., Jamestown 707, New York.



Copyrighted material

81 MULTI-Colored Flags of the World—only 15c. Kenmore, Milford F-58, N. H.

1000 U.S. Foreign Stamp Mixture 25c. Book Nook, Willmar 61, Minnesota.

WE Give Away—Your Choice Latest Scotts Albums; Catalogue and available philatelic accessories. Realize—You Get These Worthwhile Rewards When You Buy From Our Better Foreign Approvals. Write Today For Full Particulars Sent With Trial Approval Selection. Americas' Stamp Service, Riverside 2, Calif.

FREE! Big Illustrated Catalog listing everything for the Stamp Collector. Approvals. Harrisco, 204 Transit Bldg., Boston 17, Mass.

5 GERMANY pictorial Sets. Free to approval buyers. Pleasure Stamps, 1865A-52nd, Brooklyn 4, New York.

CANADIAN Collections Free—Includes early Victorian Issues—Jubilees—High Values—Commemoratives—Special Issues—Newfoundlands—Pictorials, etc., etc., together with Philatopic Magazine all free. Send 5c postage. Empire Stamp Company, Dept. PR, Toronto, Canada.

FREE! Powerful Magnifying Glass for 5c Post. Bargain lists and approvals. Jamestown Stamp Co., Dept. 202, Jamestown, New York.

BIG bag mixed stamps. Enormous quantity, $1.00. Longacre Shop, 583p Sixth Avenue, New York City 11.

BEAT this if you can! Over 520 different stamps, catalog over $11, for only 25c to serious adult approval applicants. Free illustrated price list. Cosmophilatelist, Andover, New Jersey.

NEED Higher Wages? Not when buying our stamps. Try our books of 1,000 at 1c and 2c each, or economy U. S. approvals. Clark Stamp Co., Dept. U-6, Muskegon Heights, Mich.

YOU S-t-r-e-t-c-h Your Dollar when buying our mounted 1c and 2c foreign approvals. Also U. S. at bargain prices. Don't delay, write today. Roseland Stamp Co., Dept. 9-C, Spring Lake, Michigan.

MINT King George Coronations from 5 different British Colonies only 10c with approvals. Walter Welles, Box 1246-V, Church St. Station, New York 8.

FISH, Lion, Earthquake triangles, Benelux lands 25 different, all 5c. Approvals. Hathaway, Box 211-S, Hempstead, N. Y.

COMPLETE Mint Famous Americans, $4.50. Approvals. Lou Allmendinger, Warner, New Hampshire.

300 DIFFERENT given free with approvals. Postage 3c. Windsor Stamps, 1435 E. 67th Place, Chicago 37.

DEALERS Wholesale catalog. Postage 3c. Franksco, 5031 Queensbury, Baltimore, Maryland.

FINE Approvals. Fast, personal service. What countries do you prefer? I'll send their stamps. Milton Skinner, 438 Locust, Long Beach 12, California.

50 YEAR Old Collection—U. S. Classics. 15 Selected Old-Timers each 50 or more years old—Most of 'em missing in even the biggest collections! Get all 15 of these unusual Classics for less than 1c each. All yours for just 10c! With your request for approvals. Jaro Stamp Co., Box 246-E, Church St., Annex, New York 8.

GREAT Free Offer—Weird mosquito stamp, thrilling bicycle race, gorgeous orchid, colorful native drummer, gigantic diamond airmail, stamp albums, all to our approval buyers. Bell Stamp Service, Dept. W-4, Bell, California.

FREE Bahawalpur Jubilee set to approval applicants. Lighthouse, Box 1516 Colorado Springs, Colorado.

SEND 100 different stamps, 10c and stamped envelcpe. Receive 110 different. Y. Bardsley, GPO, Seabright, New Jersey.

100 DIFFERENT U. S. 25c. Approvals. Buckeye, Box 53, Mansfield, Ohio.

50,000 STAMP Grabags 25c each. Anderson, 630a Bingaman, Reading, Pa.

FREE Sample—Interesting informative. Illustrated! National Stamp News, Anderson, South Carolina.

UNITED States! 58 Different including commemoratives, airmails 10c approval applicants. Sunsets, Box 47, South Gate, California.

PENNY Approvals—Also advanced material. "Juno," 1267 Tutwiler, Memphis 7, Tennessee.

GIANT Approvals. Thousands Different at 1 and 2c. Wahl's Stamp Exchange, 7008K Farragut Ave., Chicago 31, Ill.

TEN dandy sets, 10c. Approvals. Faszold, 423a Cameron, St. Louis Co. 15, Mo.

BIG mint sheet 10c with approvals. Hall, 28 Woodman Road, Worcester, Mass.

40 DIFFERENT U. S. 10c. Pricelist free. Seidenberg, Appleton 944, Wisconsin.

APPROVALS ½c up from 33,000 collection. Chur, Box 245, Buffalo 12, New York.

PERSONALIZED approval service. Your want lists promptly filled Ref. Neufel, 643 Eastern Parkway, Brooklyn 13, New York.

100 DIFFERENT 10c, 1000-$1.00, 5000 Mounted $12.50. Ransom, 1333 Pontiac, Ann Arbor, Michigan.

STAMP Packets: Azores 37 different $1.00. Bavaria 300 different $10.00. Bulgaria 500 different $6.00. Iraq 100 different $1.50. John Arnosti, 710 14th Street, N.W., Washington 5, D.C.

U.S. Collection—40 Airs, Commemoratives 25c! 10,000 Space Album $1.25! Robert Bristol, Collinsville, Conn.

90 DIFFERENT U. S. 30c with Approvals. Faith, 1339½ Westminster Ave., Alhambra, Calif.

½—1—2c APPROVALS. Bargains Galore! Cole, 43G Rinewalt, Buffalo 21, N.Y.

100 DIFFERENT France 10c. Approvals. Aronson, Dept. M, 91 Marion, Brookline 46, Massachusetts.

WONDERFUL Offer Seven complete mint sets only 10c with approvals. Reich (S26), 1033 Lawrence, Chicago 40.

OUTSTANDING Booklet! Easy way stamp collecting! Send dime today! "Stamps By Mail," 2133 Lunt, Chicago 45.

500 GERMANY, $2.00; 100 U.S. 50c; 200 Hungary, 50c. List free. Box 128, Gonzales, Louisiana.

1,000 DIFFERENT worldwide $1.00. Sadler, Box 8189, Plaza Station, Kansas City, Mo.

FREE Packet with United States and Foreign Approvals. Hoyt, Hudson, N. H.

YOURS Three Hungarian Triangles, Philippines, Saar, Croatia, Algeria, Jugoslavia set, etc Everything 10c with approvals. Rodman, 450 Locust Avenue, Burlington, New Jersey.

PENNY Approvals by country. M. H. Hoerning, 102, Farmington, Ark.

NICE used U.S. on approval. Shock, Box 56, Asheville, North Carolina.

MINT Five Pound British Colony stamp, guaranteed genuine, face value $25.00, just 25c to introduce our famous approvals. Viking, 130-PP Clinton St., Brooklyn, N.Y.

OUR Penny Approvals jammed with Bargains. For Better values, try Putnam Stamp Company, Mahopac, New York.

OLD scarce U. S. seconds on approval. Slightly defective, bargain prices. Hearnfeld, Clintonhill Station, Newark 8, N. J.

515 DIFFERENT 25c. Approval applicants only! Karl Klondike, Harrisburg, Ill.

LOCOMOTIVE—Airplane—Sports—many others. Free with approvals. Wirth, Norwichtown, Conn.

FREE Triangle, Price List with Approval variety collection. 1000-$1.25; 5000-$13.75. Philatelic House, Rockville Centre, N. Y.

"MONACO Nudes" (5)—10c with approvals. Royal Stamp Company, Tamaqua 2, Penna.

100 PICTORIALS worldwide $1.00 postpaid. Kreisher, 710 Walnut, Reading, Pa.

FREE perforation gauge, approvals accompany. Lancaster Stampco, P.O. Box 191, Lancaster, Pennsylvania.

BRITISH Colonials for advanced collectors at popular prices. Borgen, Box 812, Yreka, California.

FREE! Big United States stamp catalog—including value guide and identifier, plus check list. Hundreds of illustrations. Harris & Co., Boston 17-B, Mass.

CHRISTMAS Day Cachet from Christmas Florida. Free to applicants of U.S. or British Colonial approvals. Alan A. Taylor, Skyland, North Carolina.

100 DIFFERENT Spain 25c. Penny approvals included. Reed, Box 980, Chicago 90, Illinois.

250 STAMP hinges and 8 different Brazil free with approvals. Jaydee, 218 Dickinson S.W., Grand Rapids 7, Mich.

FREE! 50 Different Japanese stamps! Approvals. Star Stamp Co., Jamestown, N.Y.

NICARAGUA Sports, Costa Rica Agriculture sets 10c with approvals. Seminole Stamps, Box 1138, Coral Gables 34, Fla.

60 DIFF. USA and 200 Diff. Foreign 25c Approvals. Kem, 670 W. Florence, Los Angeles 44, Calif.

200 WORLDWIDE different, 10c. 1,000—$1.00; 3,000—$5.00. Seifert's Stampmart, Box 1672, Reading, Pennsylvania.

START your own Stamp Business. Send for Free circular. Donald Shepard, Box 1147, Chicago.

EXCHANGE—Send 100 Different Stamps 25c. We send 100 others. MacKellar, Box 4683, Los Angeles 24, California.

$1.00, $2.00, $4.00, $5.00 U.S. free, request approvals. Southern Stamp Co., Box 70, Miami, Florida.

U.S. And Confederate States illustrated catalogue free. Stone, 45 Bromfield, Boston 8, Massachusetts.

SHEPARD Stamp News. One year 20c. Sample Free. Box 1147, Chicago.

## 29 ANTIQUES, RELICS & INDIAN GOODS

ABRAHAM Lincoln Saloon License 1833. Size 9x16 25c. Columbia Mailers, Box 644, Springdale, Connecticut.

SPECIAL: 10 Indianheads, $.78—5 Prehistoric Arrowheads, $1.35—Tomahawk, $3.65—Scalper, $1.88—Hammerstone, $2.88—Pestle, $8.88—Civilwar Sword, $14.88—Bayonet, $1.98—Canteen, $1.95—Geode, Pyrite, Galena, Molybdenum, Chalcopyrite, Smithsonite, Ricolite, Vanadinite, Turquoise, Gastropod, Crinoidae, Fossil, each $.48. Heike, Wenona 40, Illinois.

SELLING 501 Historical Firearms, 20,000 Indian Relics, Collectors Cartridges, Masuma, Confederate Money.—Revolutionary, European, Civilwar, Indian Wars, Flintlocks, Muskets, Blunderbusses, Kentucky Rifles, Stagecoach Carbines, Shotguns, Revolvers, Pistols, Frontiers, Swords, Bayonets, Ramrods, Bulletmolds, Powderhorns.—Arrowheads, Gempoints, Tomahawks, Spearheads.—Mounted Birds, Pheasants, Squirrels, Deerheads, Steerhorns, Fish.—Gold Dollars, Percussion Caps, Bo-wood, Violin Wood, Marine Shells.—Agates, Minerals, Fossils, Ammunition.—Send 35c for profusely illustrated catalog.—Heike, Wenona 40, Illinois.

6 FINE ancient arrowheads $2.00. Stone Tomahawk $3.00. Ancient peace pipe $5.00. List free. Lear's, Glenwood, Arkansas.

## 30 MINERALS & PRECIOUS STONES

TEN N. Mex. Minerals $1.50; six fluorescents $1.00; Fools Gold $.25. Literature, Prospector, Winston 5, New Mexico.

GEMSTONES, Mineral specimens. Every variety. Lowest prices. Postcard brings free booklet. Plummer's, 4720 Point Loma Ave., San Diego 7, Calif.

GENUINE Gemstones—12 all different rough $3.00. Free Lists. Mueller, 1000 E. Camelback, Phoenix, Arizona.

GEMOLOGY Books! Catalog 10c. Atlantic Books, 2 Lawrence, Charlestown 29, Massachusetts.

GEMS, Precious and semi-precious, genuine, from world-wide sources. Deal Direct, no overhead, save money. Catalog 10c. Hill Co., 5450-K Portland Rd., Salem, Ore.

## 31 HOBBIES, COLLECTIONS

INVENTING can be an interesting and profitable hobby. Write for complete particulars. Institute of American Inventors, Dept. 30-E, 631-E St., N. W., Washington 6, D. C.

33 ARMY patches, collar ornaments, Campaign ribbons plus introductory surprise, only $1.00; prices 10c. Hobbyguild, Box 71, Sta. "A", Brooklyn, New York.

UNUSED matchbook covers—100 different $1.00—36 page Catalog 25c—Charles Edelman, 1311P East 84, Cleveland 3, Ohio.



Copyrighted material

NEVER before at such low prices. Jewelry parts. Findings and parts assorted $2.50 lb; 5 lbs.—$8.50. Imported beads assorted $1.50 lb; 5 lbs. $6.00. High luster pearls assorted $2.00 lb; 5 lbs. $8.50; 100 imported stones assorted $1.50; 1000 assorted $5.00. Merchandise Distributing. 19-A East 16th Street. New York 3. New York.

WANTED—Cigarette. tobacco cards. Write Charles Bray. East Bangor. Penna.

BUTTERFLIES. Real 20 beautiful assorted tropical butterflies $2.00. American Butterfly Co.. 3706 Rosedale Road. Baltimore 15. Maryland.

AMAZING hobby — Collect authentic armed forces insignia. ribbon bars. embroidered patches. naval rates; fascinating assortment of 57 for only $1; special gift free with order. Pritt Co.. Dept. S-12. 14 West 27th Street. New York City.

SEA Shell. Priced Catalogue 1200 species. 150 pages. Only book of kind in world. $2.00. Walter Webb. 2515 2nd Avenue North. St. Petersburg 3. Florida.

BIG Packet Foreign campaign ribbons. Colored Catalogues. $1.00. Medcraft. 421 6A St. N.E.. Calgary. Canada.

SEA Shells. limited offer. 1000. fifty species $5.00 Postpaid. Shellcraft. Collections. "Westcraft". Box 1022. Laredo. Tex.

WORK with durable. low-priced leathers. Leather belts. billfolds. purses. hats. dresses. blouses make ideal gifts or possessions. Tools. designs. supplies available. Free Catalog. Tandy Leather. Box 397-D. Tulsa. Oklahoma.

## 32 PHOTO FINISHING, PHOTOCOPIES, ETC.

OIL coloring photographs can be a fascinating hobby or profitable sideline for those with artistic talent. Learn at home. Easy simplified method. Send for free booklet. National Photo Coloring School. 835 Diversey Parkway. Dept. 1744. Chicago 14. Illinois.

ROLL Developed and 4x6 or 3¼x4½ oversize glossy Velox prints. 8 exposure 40c. 12 exposure 60c. 16 exposure 80c. Clemet Photo Service. 1318 West Columbia Avenue. Philadelphia 22. Pa.

PHOTOGRAPHY for pleasure or profit. Learn at home. Practical basic training. Long established school. Free booklet. American School of Photography. 835 Diversey Parkway. Dept. 1727. Chicago 14.

ENLARGEMENTS! Eight 5x7's or five 8x10's. $1.00. Wilart Enlargers. Box 967. Little Rock. Arkansas.

CHRISTMAS cards from your negative. 18 for $1. Send 10c extra for postage and packing. Three prints each good negative on 8 exp. roll 50c. L. A. Eastman. Bode. Ia.

GREAT News! Our famous Century Jumbo Oversize finishing at contact prices. Our Chicago plant. with new improved equipment. exclusive with Century. produces sensationally magnificent quality work. Any 8-exposure roll finished deluxe style only 40c. 12-exp. 55c. 16-exp. 70c. 36-exp. $1.50. Oversize reprints 5c each. Free Mailers. Send us your next order. you will be delighted with results. Century Photo Service. Box 5208. Chicago 80. Ill.

UNBEATABLE For Quality And Price. You will be surprised and pleased with the beautiful results from our celebrated Jumbo Oversize finishing. Low prices. same as contact. 8-exp. roll superfine finish only 40c. 12-exp. 55c. 16-exp. 70c. 36-exp. $1.50. Oversize reprints 5c each. Send us your order. you will be delighted. Free Mailers. Mailbag Film Service. Box 5440A. Chicago 80. Illinois.

TWO Prints each good negative. 8-exp. 45c; 12-exp. 65c; 16-exp. 85c; Reprints 4c. Mayfair Photo Service. Box 617-A. Toledo. Ohio.

COLOR Prints from color transparencies. (5 for $1.00) size 2¼"x3¼". Valu-Color. Oakwood Station. Los Angeles. Calif.

JUMBO Album Prints. 8 Exposures $.40. 12—$.50. 16—$.60. Photoshop. Box 362. Ishpeming. Michigan.

NEW—16 oversize contact prints or 8 jumbos in album. 25c with this ad. Album Studios. Dept. S. Weatherford. Oklahoma.

COPIES to 8½x11. Single page $1.00. Duplex copy $2.00. Eduard's. Box 551. Richfield Springs. New York.

FREE Mailers. 8 contacts 30c. jumbos—40c. 12—45c. Jumbos—55c. reprints—4c. Jumbos—5c. Western Photo PS122. Box 298. San Francisco 1. Calif.

## 33 MOTION PICTURES, SLIDES SOUND EQUIPMENT

GUARANTEED Fresh 8mm roll. magazine; 16mm roll. magazine movie film. Color. b&w. Free catalog. Eso-S. 47th Holly. Kansas City 2. Missouri.

8-16MM. Silent-sound films. Complete rental library All latest subjects. Free catalogue. (sample film 10c). Garden Film. 317 West 50th. New York 19.

MOVIE Camera Film: 8mm roll $1.50. 16mm 100' $3.00. Free processing. Better Films. 742 New Lots. Brooklyn. N. Y.

RENT 16MM sound films 50c reel. Large selection; free catalog. U. C. Film Service. 128 Chestnut St.. Roselle Park. N. J.

FREE Giant catalog of 8mm & 16mm films for home movie enthusiasts. Films for every occasion. Lee Stann. Dept. PS12. 11 Willard Ave.. Mt. Vernon. New York.

EXCHANGE 16mm. sound films. also for sale. Bedner. 5300 So. Talman. Chicago.

NEW 8mm full color movie film. 25 ft. double roll including super-speed processing. postpaid. $3! Guaranteed! 16mm mag. 50 ft. $6. 16mm 100 ft. $8.50. 35mm 20s for stills $2.75. Federal Film Corporation. Dept. 15. Rochester 3. New York.

MOVIES' Biggest Bargain — "Santa Claus Punch and Judy." brand new. first quality prints—150' 8mm. $1.98; 300' 16mm silent. $2.98; 300' 16mm sound. $11.95. (Postage each reel: 8mm 15c; 16mm 25c.) Used 100' 16mm Panoram musicals. six for $4.99 plus 25c postage. Used 16mm sound cartoons. sports. musicals. travels. comedies. features at but a fraction of their cost new. Real buys in screens. reels. splicers. editors and other accessories and supplies. Good used 16mm sound projectors—Ampros. Bell & Howells. Victors—frequently available at $129.95. Get on the list for Blackhawk's big free monthly catalog. Blackhawk Films Inc.. 1117 Putnam Bldg.. Davenport. Iowa.

5.000 NEW-Used 8-16mm. Silent-Sound Films. International. 2120 Strauss. Brooklyn 12. New York.

WILD Life Films. Exciting. dramatic action in the natural habitat of animals of forest and plain. 8mm or 16mm in beautiful color or B & W. Also 2"x2" color slides. Write for free illust. literature. Wild Life Films. 5151B Strohm Avenue. No. Hollywood. Calif.

SYNCHRONOUS magnetic recorder professional quality. Magnetic Recorders Co.. 7120-A Melrose Ave.. Los Angeles 46. Calif.

REGER 16MM silent movie projectors. Ideal Christmas gift at $18.95. Write for free descriptive literature. Reger Mfg. Corp.. Box 110. Mt. Clemens. Michigan.

KOREA 1952 Kodachrome slides 30 for $12.95. Custom. 952 Atkin Avenue. Salt Lake City 6. Utah.

## 34 CAMERAS, PHOTO SUPPLIES

BASS Says: Trading cameras a national habit since 1910. Write to Bass the old "Horse Trader." A postcard will do. Simply say: "Bass. I have and I want . . . How much will you allow me?" Satisfaction guaranteed. Bass Camera Company. Dept. AG. 179 W. Madison St.. Chicago 2.

ARGUS C-3. case. flash. Spotless. $51.90. Argus C4. case. never used. $80.00. Free catalog. 1001 bargains. Dealer's Mart. Dept. S12. 11 Willard Ave.. Mt. Vernon. New York.

INSURED and guaranteed repairs at trade prices. Camera Repair Corp. of America. 225-C Broadway. New York 7.

PHOTOGRAPHY for pleasure or profit. Learn at home. Practical basic training. Long established school. Write for booklet. American School of Photography. 835 Diversey Parkway. Dept. 174C. Chicago 14. Illinois.

10" REFLECTOR complete with clamp. cord. socket. #2 flood bulb 2 for $4.95. Caruso Supplies. Mamaroneck. New York.

WHOLESALE Photographic Supplies. Cameras. Films. Projectors. Enlargers. Write for Free Catalog. Capitol Photo Supplies. 2428 Guadalupe. Austin. Texas.

ARGUS C-3 Owners. equip your camera with the Ontora Attachment to prevent skipped frames and double exposures. Makes the C-3 easier to handle than the highest priced cameras. Price $3.95. For full information write to Ontora-5. Box 41042. Los Angeles 41. California.

HUMOROUS old time color slides for home projection. Illustrated catalog free. Universal. Box 629-S. Beverly Hills. Calif.

SUN-lite Strobe unit. perfect for all shutters. original cartons. $47.00. Free catalog. Dealer's Mart. Dept. S12A. 11 Willard Ave.. Mt. Vernon. New York.

## 35 MUSIC, INSTRUMENTS & SONG WRITERS

WANTED! Poems for musical settings. Write Songwriters' Service. Clifton. N. J.

POEMS Wanted to be set to music. Free examination. Send poems. McNeil. Master of Music. 510-PS. S. Alexandria. Los Angeles. California.

POEMS Wanted for musical setting. Send poems for free examination. Five Star Music Masters. 646 Beacon Bldg.. Boston. Mass.

POEMS Wanted for musical setting on percentage basis. Broadcast consideration. Sooner Song Co.. 22-PS North West 8th. Oklahoma City 2.

SONG Poem Writers! Get the Facts First. Send for Free Booklet. "Songwriting Secrets" and Outstanding Offer. Melody House. Dept. PS2. Box 19007 LaTijera Sta.. Los Angeles 43. California.

POPULAR Songs. How to write and sell them. Write for free booklet Successful Songwriting. Gateway Songs. Box 2470. Hollywood 28. California.

SONGWRITERS! Send poems. songs. Music Service. 243 West 72nd St.. PS. New York 23.

ELECTRIC Guitars. accordions. amplifiers. Wholesale. Free catalog. Carvin. Baldwin Park. Calif.

SONGWRITERS! Outstanding. convincing offer. Hibbeler. C-15. 2157 N. Avers. Chicago 47.

WANTED; Complete songs—and lyrics—for consideration for recording under Nationally advertised label. If accepted broadcasts and placing your recorded songs on market assured. $1.00 brings you one of our new records. C. Isabel Mayer. Box 3896. Portland 8. Oregon.

ACCORDIONS new and used. Student or professional. World's finest makes at the lowest prices anywhere! Save 50% and up! Trade-ins taken. House of Accordions. 10 Conway Road. Shelburne Falls. Mass.. Tel. 896.

SENSATIONAL Free Booklet. "How To Write and Sell Songs." Get the facts first. Poems examined Free. Reliable Music Service. Box 430-B. Hollywood 28. Calif.

FREE Record—Your Words—My Melody. Free information. Johnny Mack. 1094-3/4C West 39 Street. Los Angeles 37.

POEMS Wanted! Immediate consideration! Song Promotion Guild. 350-P Broadway. New York 13.

1952 ACCORDIONS—Wholesale. Free catalog. American Accordion Center. 5329 Belmont. Chicago.

## 36 RADIO, TELEVISION, SUPPLIES & EQUIPMENT

MAKE simple. tubeless. batteryless. distance-getting crystal radios. Crystal and illustrated instructions 25c postpaid. Allen. 427-S. Clinton. Mo.

BUILD 15 Radios—Only $1.30 Each. Experience Unnecessary. Home Radio & T.V. Course. includes Trouble-Shooting and Servicing Lessons. Radio Principles. Code Instructions. Practical Radio Building and Repairs. You build and keep Receivers. Transmitters. Amplifiers. Test Equipment. Code Oscillator. All parts. tools. instructions supplied including Radio Tester and Electric Soldering Iron. Write for full particulars and receive absolutely Free your copy of "Radio & TV Repair Guide." No obligation. Progressive Electronics Co.. 497 Union Ave.. Dept. PS-25. Brooklyn 11. New York.

RADIO Tubes. surplus radio equipment. bargains. Ask for list. Kay Electronics. Box 25. Hollis. New York.



Copyrighted material

# POPULAR SCIENCE OPPORTUNITIES

FREE 236 Page 1953 Television-Radio-Electronic Catalog! World's largest stocks, lowest prices. Complete supplies for builders, experimenters, amateurs, servicemen. Latest television, radios, phonos, recorders, sound equipment. Thousands of parts, tubes, test instruments, books, diagrams. Top quality money saving values. Get yours now! Allied Radio Corp., 833 W. Jackson Blvd., Dept. 31-M-2, Chicago 7, Illinois.

REPAIR Radios easily; anyone! Two hour simplified course with inexpensive tester $1.95. Guaranteed. Radio, 1121Q, Lincoln 8, Nebraska.

MONOTUBE Radiokit complete! Nothing else to buy. Broadcast—band battery set with 5" speaker, batteries, tube, full instructions. No technical knowledge required—only $5.75 Postpaid. Barry Electronics Corp., 136 Liberty, New York 6, New York.

AERIAL Transformer—it's between a sender and receiver. $4.98. P.O. Box 83, New York 2.

BUILDER'S "Pictorial Construction Plans". Free List. Alena, Box 24, Astoria 6, New York.

INGENIOUS Radio-Electronic Circuits. Kits, Literature. Information free! Serco, X261F, Waltham, Mass.

MAKE Distance-Getting crystal radio that works. Fully illustrated booklet fifteen cents. Money back guarantee. Francis, Box 5963, Cleveland, Ohio.

BUILD your own high fidelity FM or FM/AM tuner. New type kit. Tuning units, I.F. amplifier wired and tested. Punched chassis, tubes, dial, hardware included. Complete kits start at $55.00. Individual components from $10.00. Write for literature. Collins Audio Products Co., Route 29, Westfield, New Jersey.

## 37 BUSINESS OPPORTUNITIES

BIG Money and fun growing Live Miniature Ming Trees on your window sill. Write for Free rare tree seed and plan. National Nursery Gardens, 8463 South Van Ness, Inglewood 4, Calif.

GOOD Paying Business Silvering mirrors, plating autoparts, reflectors, bicycles, bathroom fixtures, etc., by late methods. No tanks or shop required, outfit furnished. Free Booklet. Gunmetal Co., Ave. E, Decatur, Illinois.

EXTRA Money—No Selling—operate vendors. Amazing profits, details Free. Silver King, Suite 221, 622 Diversey, Chicago 14.

OPERATE profitable mail order business. Write Walter Service, 4159-B East 112th, Cleveland 5, Ohio.

MAKE money addressing envelopes. Our instructions reveal how. Glen Glenway, 5713 Euclid, Cleveland 3, Ohio.

HOW and where to obtain Capital? Free details. Star Service, Wapakoneta, Ohio.

RECAST old batteries into new. Latest achievements. Battery Laboratories, Minneapolis.

MAKE $3.00 Hour At Home—I do—making sandals. George Youngs, 1308 South First, Arcadia, California.

ELECTRO Plating equipment—New and used. Complete assemblies. All sizes for all types of plating. Baby shoe metalizing sets. Mounts, supplies, instructions. Free catalog. Hollywood Bronze Supply, Dept. R, 1624 E. First Street, Los Angeles 33, Cal.

BUY Wholesale. Thousands articles. Supply directory 10c. Idealex, Park Ridge, Illinois.

MAKE Money spare or full time, casting Metal Toys and Novelties. Big wholesale and chain store demand for Autos, Soldiers, Ashtrays, Banks, etc. keeps manufacturers busy. Production moulds furnished for up to 100 and more castings per hour. No experience or special place necessary. Write for information and illustrations of patterns needed. Metal Cast Products Co., Dept. E, 1696 Boston Road, New York 60, N. Y.

ENVELOPES addressed accurately, reasonably. Fast Service. We have capable addressers in your city. Glenway System, 5713-X Euclid, Cleveland 3, Ohio.

"PROFITABLE Decorating Business." Fascinating! Instructive. Only $1.00. Fran Council, Box 150-P, Wildwood, New Jersey.

IMPORT-Export! Opportunity, profitable, world-wide, mail-order business from home, without capital; or travel abroad. Established World Trader ships instructions for no-risk examination. Experience unnecessary. Free details. Mellinger 1C, Los Angeles 24.

MAKE Money At Home as renewal headquarters for all magazines. Big Christmas sales profits now. Liberal commissions. Supplies furnished. Write for Free Catalog. McGregor Magazine Agency, Dept. 510B, Mount Morris, Illinois.

TO $35.00 Weekly. Spare Time. Home Operated, Mailorder Business. Successful "Beginner's" Plan. Everything supplied. Lynn, 10420-C National, Los Angeles 34, California.

BIG money in your own business. Details free. How, Box 684-B, St. Louis, Missouri.

THRILLING Profitable Home Business. Make fast-seller chenille monkey trees, dolls, flowers. Terrific holiday demand. Information free. Velva, Bohemia 17, N.Y.

MAKE Gifts, Novelties, Jewelry, from sea shells, fish scales, plastics! Wholesale, illustrated catalog 10c. Giftcrafts, Box 4550-PP Coral Gables, Florida.

FOR an extremely profitable lifetime business, operate a Collection Agency. Quickly learned. Write Cole Associates, Syracuse 2, New York.

MAKE $6.73 Every Time You sell one—and they're amazingly easy to sell! We have new Adding Machines in original factory cartons you can sell for only $14.95 and you make 45%. They're executive model portables, precision built with automatic clearance, direct subtraction, fully guaranteed. Send for life size color photo with full details. Write today to Lightning Adding Machine Co., Inc., Dept. P-8, 1260 West Second Street, L. A. 26, Calif.

$25 WEEKLY Working two hours daily. No canvassing. No manufacturing. Lycke, Box 2471-B, Cleveland 12, Ohio.

SELL by mail; free details; instructive booklet 25c. Manhattan House, Box 51-L, St. Albans 12, New York.

LEARN Sewing Machine Repair. Electrify, rent, trade, sell. Make up to $125 week spare time. New machines, motors, etc. wholesale. Details free. Taylor Service, Hamilton PS-12, Ohio.

MAKE Green Dyed Lycopodium Christmas Wreaths. Fascinating production course. Supplies. Enclose 25c for sample corsage. Lycopodium Foundation, St. Paul 8, Minnesota.

MOLD Making Liquid Rubber; Sample pint, with instructions, $2.00 postpaid; Plastercraft Supply Company, 3051 St. Clair Avenue, Cleveland 14, Ohio.

ADVERTISING book matches—Cash in on big demand—sell Union Label matches. Cuts for all businesses and political parties—Free powerhouse selling kit—low prices—protection guaranteed on repeat orders—Cash commissions. Superior Match Co., Dept. PX-1252, 7530 Greenwood, Chicago.

VENDING Machines earn big money! An investment as low as $10.50 will start you in this fascinating profitable business that can lead you to the road of success and independence. Routes can be established and operated in either full or spare time with no experience needed. Write for full details and our Free catalog illustrating our nut, candy, gum and stamp vendors; also pin ball machines, music boxes, etc. Write immediately to Parkway Machine Corporation, Dept. 9, 715 Ensor Street, Baltimore 2, Maryland.

EARN Money With Typewriter—Sewing Machine! Spare Time! Details free. Edwards, 3915-PS 12th, Des Moines 13, Iowa.

RADIO Advertising Without Risk! Pay "per order"! 400 broadcasters! Details free! Simon-C9, 48 Fifth Avenue, Pelham 65, New York.

FREE Valuable Catalog. Over 2000 select Businesses, Farms, Ranches & Income Properties for sale thruout West. Contains prices, addresses, etc. Write us What and Where you want to buy—and we'll advise sellers of your requirements. No salesmen—No Commission to pay. Write for Free Catalog No. 77, National Business & Property Exchange, 4101 West 3rd St., Los Angeles 5, California.

MAIL Order Exclusive Auto-Up When It Rains & Closes Convertible Tops and Power Windows. Superior, 49 N.E. 22nd St., Miami, Florida.

CONVERT hand mowers to power mowers. Do it now, this winter. Sell the Handy-Dandy conversion kits. Easily installed on 16 to 20" mower. Use any small gasoline or electric motor. Quick delivery. Kits purchased with or without engines. Also new garden cultivator. Cultivates 3" deep. Attachments available: weed cutter, lawn mower, snow plow, and rotary snow brush. Discount to dealers. LeClaire Manufacturing Company, LeClaire, Dept. PS, Iowa.

BUY Wholesale thousands nationally advertised products at big discount. Sent free. "The Wholesale Plan." American Buyers' Service, 628-S Linden, Buffalo, N. Y.

SENSATIONAL New offer. Make costume jewelry at home. No experience required. 500% profit. From marine and botanical life: orange blossoms, pansies, starfish, etc. Free information. Write Jewelry by Julium, Box 460, Ft. Lauderdale, Florida.

AMAZING new moth-resistant genuine crushed redwood cedar compound with DDT! Prevents moth damage. Makes fragrant cedarized closets, applied like paint, laboratory tested. Hardware, paint, building supply dealers, contractors buy quantities. Exclusive distributors. Tremendous profit potential! Low priced; attractively packaged. Write for details, Cedarco, 90-H Summit, Brookline, Mass.

NATURAL Molding Latex. Extra thick. Free sample. W. Wooley, 115B Donald, Peoria, Illinois.

EARN money, spare time, homework, experience not essential. Literature free. Claude Wiese, 1516 Franklin, Waterloo, Ia.

MAIL Selling opportunities galore! Free! Wehner, Box 142-E, Roxbury 19, Mass.

UP To $200 Weekly! Work home, start spare time, small capital. Free book "301 Unique, Successful Businesses" tells how. Deumant Publications, 79-T Deaumant, Kenmore 23, New York.

LIQUID Rubber, make flexible molds. Free Sample. Chaney, 1130 E. 16th St., Jacksonville 6, Fla.

FREE Wholesale Catalog—Costume jewelry, watches, premiums, giftware. Very Low Prices. S. Canterman, Oglethorpe St., Pittsburgh 1, Pa.

MAKE Perfumes At Home. Write, "Carey Laboratories," 1914 Chouteau PS-12, St. Louis 3, Missouri.

MONEY in new greaseless doughnuts. Start in kitchen. No smoke. Sell stores. Free recipes. S. Ray Co., 3605 South 15 Ave., Minneapolis 7, Minn.

COLORGLAZED Concrete Pottery made without molds. Patented method. Cemetery products, novelties, tiles. Basement leak-sealing. Money-making projects. Booklet, details free. Men only. National Potteries, Grand Rapids, "Minnesota."

EARN Extra Money weekly mailing circulars for advertisers. Complete instructions—25c. Siwaslian, 4317-B Gleane Street, Elmhurst 73, New York.

MAKE Rubber Stamps, repair dolls, learn invisible reweaving. Molding Latex, New Low Prices. Catalogue of "40 Ideas". Universal, Box 1076-B, Peoria, Illinois.

MAKE Money at home—mailing literature—running Ads. Pleasant and profitable. Write Miller, 1772-R Carlyon Road, East Cleveland 12, Ohio.

REPAIR any home sewing machine. Simplified, illustrated, comprehensive, repair manual. Guaranteed. $4.95 postpaid. Fielding Sewing Machines, Box 133, Oakland 21, Calif.

START Business without Capital! Reliance, 15-B Park Row, New York 38, N. Y.

SPECIALIZED Magazines covering your field of interest help You to greater success. Get latest copies through our Easy-to-Get-Acquainted Service. Hundreds of business, trade, professional, educational, sport, hobby, cartooning, chemical, chiropractic, clothing, coal, coin collector, industrial, confectionery, construction and others covering All interests. Send for List today. It's Free. Commercial Engraving Publishing Company, 34S North Ritter, Indianapolis 19, Indiana.



Copyrighted material

# POPULAR SCIENCE OPPORTUNITIES

MAKE flexible molds! Cast plaques, bookends, figurines! Free sample! H. Tooker, 630-A Chestnut, Hamilton, Ohio.

BUY Wholesale—Catalog appliances, jewelry, etc. E. C. Ellison, Dept. A, 409 Hazel Street, Warren, Penna.

HOW to raise capital. True, Amazing plans. Free details. Everett Hale, P. O. Box 997, Newark 1, New Jersey.

$100.00 A Month Home Business, No Canvassing. Details 25c. Reynolds, Box 144, Natick, Mass.

SELLOUT Mailorder items. Samples 30c. Mailorder Books 30c. (Retail $1.00) Persil, 436 N. Y. Ave. Brooklyn 25, N. Y.

SILK Screen Printing offers great opportunities. Complete Course only $4.95. Facts free. Typecrafters, 510-E West Susquehanna, Philadelphia 22, Penna.

PROFITABLE Home business, electroplating novelties, giftwares, autoparts, mirrors. Easy, inexpensive home processes. Free booklet. Tyco Metals, Box 13231-CM, Houston 19, Texas.

CAN The Boss! Make building plastic of waste. Flooring, plaster, stucco. Beautiful, durable, economical. Bays Laboratory, Oklahoma City 9.

MAKE Fast-Selling Repeat Order Products At Home—no machinery—everything furnished. Write: Shepard, 455-C West 34th, New York 1, New York.

"MAKE Perfume" Catalogue Free. "International." 6347 Parnell—PS-12, Chicago 21, Ill.

GET Dollar Orders In Your Mail—keep 90c. Everything supplied. Genmerco, Box 142-C, Dorchester 24, Mass.

SELL By Mail to automobile owners. Millions of prospects. Fast selling items. Everything furnished. Write: Eastern, Box 142-S, Dorchester 24, Mass.

"PROFITABLE Mail Selling". Twelve Tested Plans. Write: Edwards, Box 1067-S, Allen Park, Michigan.

MAKE Money At Home Mailing Cards-Circulars. We supply every need and start you with almost no investment. Paton's, Box 55-A, New York 23, New York.

ADDRESS Envelopes, Postals, at home—longhand, typewriter. Stamp appreciated. G. Torrey, Melrose 76, Mass.

RUBBER Molds! New catalog illustrating over 100 professional molds, 10c. Castcraft Studios, 508-PS Marion St., Brooklyn 33, N. Y.

BUY Wholesale big name items. Details free. Young's, Kent 3, Ohio.

BOOKKEEPERS earn $1000.00 Month operating Bookkeeping—Tax Consultant Service. Details free. Universal, Box 664-P, Springfield, Missouri.

CO-Partners Wanted—Share in Big Time profits publishing—selling New book with terrific possibilities. Foreman, 351-A Fairmount, Jamestown, New York.

SELL By Mail To Women—real merchandise. Everything furnished—orders filled. Big profits. Charles, Box 32-P, New York 63, New York.

FREE Demonstrator offer. Power mowers, '53 models. Appoint dealers-agents. Permanent. Rotacut-52, Excelsior Springs, Missouri.

DRIVING School Home Business franchises now open. Million Dollar field. Your new car every year pays for itself! New Free plan. Starts you immediately. Nothing to learn. We supply complete printed courses for your students backed by national advertising. Affiliated Driving Schools, 1577½ West Washington Blvd., Los Angeles 7, Calif.

MAKE your typewriter earn money. Information—25c. Philips, 72 Prospect, Paterson 1, New Jersey.

TIN-Cans. Turn them into cash. Nine methods. Instructions 50c. Charles Company, 12-EAM, Norwood, Ohio.

EXPERIENCED Roof Repairer Franchise Protection. Luster-Kote, 19417 Derby, Detroit, Michigan.

$250 WEEK reported! Free book "505 Odd, Successful Businesses." Work home! Expect something Odd! Pacific-36C, Oceanside, California.

HOMEWORK—easy—profitable. Rush name. Siegel, Box 183-PS, New York 2.

NEWEST Spare, Full-Time Business. $5 to $10 hour possible. Paint with Suede—the finish with touch And eye-appeal. Beautify auto dashboards, signs, radios, toys, figurines, lamps—100, 1 others. Complete, Step-By-Step Instructions sent for no-risk examination. Free details. Coast, 1004-AF So. Los Angeles St., Los Angeles 15.

YOUR own business. No capital investment, no manufacturing, no selling. Deal with largest firms. Tremendous possibilities. Particulars $1. Box 31, Winnetka, Ill.

BUY Wholesale 740,000 Items. Details Free. Cottage Industries, Omaha 12, Neb.

20% TO 50% off on thousands articles. Free details. Write: United, Box 87-A, Detroit 2, Michigan.

GET hundreds money making new business ideas. Amazing! Details Free. 5538-B Lexington, Mail Service, Chicago 44.

MAKE spare time money at home, compiling mailing lists. No experience needed. We teach how. Instruction folio 25c. Bruce Company, Sharon, Mass.

BOOKKEEPERS — Operate profitable "No-Ledger" bookkeeping service. Write Frye, Box 432, Chester, South Carolina.

$100 WEEKLY in your spare time with sensational electronic device. Springfield Enterprises, Box 54-D, Springfield Gardens 13, New York.

BUY it wholesale. Manufacturers. Distributors. Over 850,000 items. Literature free. Olsen, 1231-B East Third St., Duluth 5, Minnesota.

MEN-Women—"Everybody Likes Candy." Learn to make professionally at home. Tools and supplies. (Our 42nd year.) Ragsdale Candies, East Orange, N. J.

BITS of Plywood; Jigsaw. Exceptional income: Literature Free. Woodarts, PS-153, Bridgewater, Massachusetts.

MEN-Women! Let us prove how you can make Big Money at home making novelties, spare or full time. Absolutely no previous experience necessary. We supply names of interested buyers for your finished products. Valuable Liquid Marble information). Send for Free Catalog—"There's Money in Plastics"—Today! Write: Bing Products, PS1252, Watertown 72, Mass.

FIX typewriters. Free booklet describes our modern, inexpensive home-study course. Factory methods taught. Write Typewriter, Building 4, Tarentum, Penna.

HOME Mail Business! We supply exclusive product - Advertising - Everything. Experience unnecessary. Start low as $150. Terrific Potentialities. Write: NMD, Agency, Box 88-C, Dorchester 22, Mass.

HEATING And Ventilating—Air Conditioning Library. You save a huge 60% of publisher's price on this sensational offer—one of the most exciting we've ever made! You get the world's most complete, most lavishly illustrated, authoritative home-study course in principles, design, selection and application of Heating and Air-Conditioning Appliances and Systems for residential and commercial use . . . A Complete Library of Six big books, each indexed. Over 2,000 fact-studded pages, many hundreds of tables, charts, diagrams, photos, drawings. Easy-to-Follow "question and answer" instruction. Here's Everything you'll ever need to know to become a well-paid, top-ranking expert in this excitingly important field. All the facts, illustrated, on Blueprint Reading, Architectural Drawing, Sheet Metal Work, Insulation, Heat Losses and Gains, Thermo-Dynamics, Logarithms and Tables, Furnaces, Unit Heaters, and more! Prepared by 18 of the nation's top engineers and authorities. Our supply of these handsomely bound, silver-stamped volumes is severely limited. In all fairness, it must be "first come, first served." Big 11 lb., 6-Volume Library published at $24.80. You send only $9.98! Money back if not fully delighted. Dept. 1292-C, Popular Science, 353-4th Avenue, New York 10, N. Y.

## 38 MONEYMAKING OPPORTUNITIES

START a buying service, buy wholesale thousands nationally advertised products. Make big profits selling at sizable discounts. Send postcard for details. American Buyers' Service, 631-S Linden, Buffalo, New York.

21 POPCORN, Candy Apple Formulas, proven money-makers. Send $1 today for formulas, catalog of money-making ideas. Concession Supply, 3916 Secor, Toledo, O.

SPARETIME Profits Taking Subscriptions, All Magazines. Wholesale Catalog Free. Cassell Agency, Westfield 1, N. J.

BE Appointed State Notary Public Now! Details; Stationers, Helotes, Texas.

MAKE Money—Sewing and Assembling at Home. Liebig Industries, Beaver Dam 7, Wisconsin.

DETECTIVES Earn Big Money. Experience unnecessary. Detective Particulars free. Wagoner, P-125 West 86th, N. Y. 24.

SCHOOL Seniors—Earn sensational profits selling classmates America's Most Beautiful Graduation Name Cards. Largest selection. Outsells all others. Free sample kit. Printcraft, Dept. P, 1509 Maple Street, Scranton 5, Pa.

$10,800 PROFITS! Your own Mailorder Business! No Capital Risk! "Success Plan" (worth $2) Free! Write today! Treasury, 149 Storer, New Rochelle PS-6, New York.

300% PROFIT making and selling seamless wallets—only scissors needed. Send $1.00 for pattern. Barcklon, Box 33, Westville, New Jersey.

ADDRESS Envelopes! We pay cash! Outfit—25c. Hirsch, Spring Valley 3, New York.

MONEYMAKING Opportunities Literature Free. National Hobbies, Box 524, Rochester, Minnesota.

LEARN Watch-Clock Repairing at Home While learning we fix your watches—clocks—Special Bonus Offer—Inquire Modern Technical Supply, 55-PS West 42nd Street, New York 36.

$100 WEEKLY commissions taking magazine subscriptions. Details: Courier, 40-69B 97th Street, Corona 68, New York.

BE Your Own Boss! Free book "301 Unique, Successful Businesses" tells how. Start spare time, small capital, work home. Deumant Publications, 83-T Deumant, Kenmore 23, New York.

EARN Money Evenings, copying and duplicating comic cartoons for advertisers. Adservice, Argyle 2, Wisconsin.

SELL Titania gems; $9.75 carat wholesale. More brilliant than Diamonds. Free catalogue. Diamonite, 1404-S Mitchell, Oakland 1, Calif.

TYPEWRITER Owners make handsome profits. Get details today. Groves Company, 682, Hastings 3, Nebraska.

PROFITABLE Money making New Formulas, Processes, Trade Secrets. Book, over 900 pages, $4.00 postpaid. Bonnay, 908 Girard Blvd., N.E., Albuquerque, N. Mex.

WIN contest money. General Contest Bulletin gives hundreds of tips. Lists current contests and rules. Sample 25c. General Contests, 1609-A East 5th, Duluth, Minnesota.

$100-$200 WEEKENDS no selling or manufacturing. Brennan, 4025-Y Lankershim, North Hollywood, Calif.

WONDERFUL opportunity making money addressing envelopes at home. Free information. Baron's, Custer, Washington.

$$$ IN Personalized Baby Record Books. Sell By Mail Use Same Literature We Do. No-Co-Ro, Oakland 6-P, Calif.

$35 WEEKLY addressing envelopes. Instructions $1, refundable. Adservice, Spring Valley 36, New York.

FREE literature describing money-making plans. Oren Robertson, Bonita, La.

FREE advertising! Thousands new unusual products! Operate profitable Giftware-Home Products Mailorder Business. Free success plan! Write H. G. Seidel, 7070 Hollywood Blvd., Hollywood 28, Calif.

MANUFACTURE Rhinestone and Pearl Jewelry at home. Latest creations, tremendous profits, no skill needed. Postcard brings illustrated catalog of settings, stones, etc. A. V. Cutt Co., Inc., 210-H Fifth Ave., New York 10, New York.

$200 WEEKLY selling books, merchandise by mail, details free. Instructive booklet 25c. Products, 526 S. Western, Chicago 12, Illinois.



Copyrighted material

# POPULAR SCIENCE OPPORTUNITIES

FREE Book "505 Odd Successful Businesses." Work Home! Expect something Odd! Pacific-35C. Oceanside. Calif.

PROFITABLE Year-Round Income upholstering automobiles. Diagrammed instruction manual shows easy way to make and install seat covers, door panels, headlinings, tops, etc. Only $2. Free literature. Purifoy Upholstery Service. 602-BB South State Jackson. Mississippi.

MEN—Women, you can earn good money for spare time work. Write today: Martin Service. Preston 3 Virginia. Addressed envelope appreciated.

NEWSPAPER Clipping Bureau! Instructions 25c. Shroeder. 803 Wisconsin. Peoria 4. Illinois.

MAIL-Order is profitable. We can start you immediately. Details: Paragon. Box 5. Providence 8. Rhode Island.

EARN Money Sparetime. 101 Plans 25c. Commonwealth. 5708-B Carothers. Cincinnati 27. Ohio.

STUPENDOUS Fantasit—but true—amazing new way to make money. Rush $2.00 today for complete unit. Diamond Company. 43 Abbottsford. Brookline 46. Massachusetts.

## 39 FORMULAS, PLANS, ETC.

FORMULAS—All kinds. Latest products. Literature free. Kemico. Park Ridge 15. Ill.

NEW formulas write: Dr. Hertstein. 511 Thomas. Grand Rapids. Michigan.

SECOND Printing. Improved version. spectacular chemical fireworks experiments manual. Complete setups. formulas. instructions. still $1.00 postpaid. Chemi-Technix Laboratories. 568H Riley. Buffalo 8. New York.

LABORATORY tested formulas. Lists free. Pont. Box 635-PS. Terre Haute. Ind.

CHEMICAL Formulary. Volumes I-IX. $7.00 volume. Free description. Booklist. Engineering Handbooks. Libraries. Technical. Arts. Crafts. others. Paullin. 109S. Loudonville. Ohio.

ANY Formula $3.00. Chemical Instruction Sheet—catalog 10c. J. Belfort. 216 W. Jackson. Chicago 6.

FOR the best in modern manufacturing formulas. get my literature! Established 1897. Liscombe Miller. Tampa. Florida.

## 40 PLASTICS

LUCITE. Plexiglas. Any size sheets masked Square foot (12 x 12) cost 1/16" $1.20; 1/8". $1.40; 3/16" $1.75; 1/4". $2.08. Include 10% postage. Almac Plastics. 230 Fifth Avenue. New York 1. New York.

PLASTIC Sheets. Rods. Tubes. etc. Free List. Plastic Supply Co.. 2901 N. Grand Blvd.. St. Louis 7. Mo.

LEARN Plastics at home. Small cost—Spare time. Dime brings sample plastic. three experiments. full details. Plastic Projects. Box 5151. Detroit 35. Mich.

MANUFACTURERS of a complete line of internal carvings. Special introductory offer: $1.00. jewelry set and keychain. Crystal Floral Company. Bound Brook. N.J.

MAKE Plastics. Simple instructions. formulas. $1.00. Materials readily available. Lab. Box 232. A. St.. Cashmere. Wash.

NEW Liquid casting plastic. Clear. colors. Embed flowers. insects. coins. Saw. drill. carve. Free Folder shows fine things you can make at home; sell at big profit. Write today. Castolite. Dept. P-102. Woodstock. Illinois.

"WORKING With Plexiglas" 70 page Illustrated Plastic Manual. Material Catalog $1.00 Postpaid. Plastic's. Box 1812. Salt Lake City 10. Utah.

PLASTICS. Lucite. Plexiglas. Acetates. complete supplies. Retail-Wholesale prices. Catalog 10c. Airmailed 35c. Gem-O'-Lite. Box 6861N. North Hollywood. California.

## 41 CHEMICALS & APPARATUS

LABORATORY Apparatus. Chemicals. Microscopes. Complete Chemistry Sets. Minerals. Uranium Ore. 10c brings catalog. Porter Chemical Company. Hagerstown 2. Maryland.

CHEMICALS and apparatus for industrial. analytical. and private laboratories. Catalog 20c. Dept. M-26. Biological Supply Co.. 1176 Mt. Hope Ave.. Rochester 20. N. Y.

SPECTROSCOPE for quick chemical analysis $3.00. Cutting Sons. Los Altos. Calif.

NEW Idea Chemical and Apparatus Outfits for Home Experimenting Photo-Scales. Microscopes. Chemicals. Biological and Laboratory. Supplies in Small Quantities. Catalog 25c. Established 1931. John H. Winn. 124-B West 23rd Street. New York. N.Y.

SECOND Printing. Improved version. spectacular chemical fireworks experiments manual. Complete setups. formulas. instructions. still $1.00 postpaid. Chemi-Technix Laboratories. 568H Riley. Buffalo 8. New York.

ILLUSTRATED Catalog: Chemistry. mineralogy. biology. 10c. Tracey Laboratories. Evanston. Illinois.

SAVE Money! Supplies Catalog 20c. refundable: Laboratory Sales. Box 161-G. Brighton. Mass.

AMAZING New Book of Science. Experiments. Formulas and catalogue of Laboratory Supplies. Only 25c; National Scientific Co.. Dept. 15. 2204 W. North Ave.. Chicago 47. Illinois.

EXPLOSIVES—50c brings instructions for making nitroglycerine-guncotton-blasting caps and many others. Fortland Chemical Co.. 1729 N. Decatur Rd.. Atlanta. Ga.

LUMINOUS Paints will glow in dark. Six colors. Fairmount Chemical Co.. 13 Liberty St.. New York City 6.

## 42 HELP WANTED

FOREIGN & Latin American Employment 1953 "Foreign Service Directory" gives Up-To-Minute Facts on Military & Civilian Construction. Government Jobs. Major Oil Listings. Aviation. Transportation. Steamship Lines. Mining. Importers. Exporters. How-When-Where to apply. application forms. Hot List Firms Hiring. $1.00 postpaid. Global Reports. Box 883-S. Hollywood 28. Calif.

FOREIGN Employment Construction men. building trades. helpers. office men. others. interested in Foreign Projects. High wages. quarters. transportation. Send $1 for Foreign Construction Compendium and Application Forms. Foreign Service Bureau. Dept. PS-12. Metuchen. New Jersey. (Not an employment Agency—no fees.)

WANT To Make More Money? Have a real career with a lifetime of high salaries? I'll show you how to succeed in the growing automotive-diesel field. Write Ed Howes. Chief. Dept. 5122. 4000 S. Figueroa St.. Los Angeles 27. No obligation.

CONSTRUCTION Job List. Published Monthly. $1.00. Dempster's Construction Scout News. Dept. 268-DU. Bridgeport. Ill.

OVER $1300 a month are the wages of truck drivers on some construction jobs. For complete foreign job listings send $1. Construction Workers Service. 1111 Commerce Bldg.. St. Paul. Minnesota.

$1.000.000 FOREIGN & Domestic Construction Projects published Monthly. gives Contractor & Locale. How-When-Where to apply with application form. Global Reports. Box 883-PX. Hollywood 28. Calif.

FOREIGN Jobs. Contracts underway and soon starting in Africa. South America. Canada. England. Europe. South Pacific. Middle East. Mexico and Alaska. Send $1.00 for foreign job news. information. application forms. etc. DCS Foreign Job News. Dept. 268-DV. Bridgeport. Ill.

OVERSEAS Jobs. Big pay. transportation. expenses. Clerical. professional. mechanical workers. Most all trades. Latest listings airline. construction. manufacturing. oil. steamship companies. government agencies. many other opportunities. Up to date information on securing employment. contracts. income tax. applications forms. $1.00. Overseas Jobs. Box 335-B4. Baton Rouge. La.

NORTH Atlantic Airbase job. hiring hundreds monthly. Laborers earn $1100. up; skilled $1400 to $2250 per month. Folio. $1.00. Jobservice. Box 1565. Billings. Montana.

CANADA'S huge industrial expansion creates labor shortages. Send $1.00 today for our monthly "Construction Worker's Bulletin" which lists construction jobs under way. and pending. oil companies drilling and Immigration Regulations. National Surveys. P. O. Box 402. Vancouver. B.C.. Canada.

HONOLULU Help Wanted columns airmailed $1.00. Pomeroy's. =3 Campbell Block. Honolulu. Hawaii.

ALASKA!! Last American Frontier. $1.00 brings 1953 Business Directory & Government Map. Military & Civilian Construction; Homestead & Highway facts; Mining. Aviation. Fur Farming. Grazing. Timber. Travel directions. List of firms hiring. How to apply. Alaska Opportunist. Box 883-S. Hollywood 28. Calif.

## 43 AGENTS WANTED

GOLD Lacquered and silver sign letters. Windows. doors. trucks. Standard Sizes. Penny and up. Samples. Atlas-G. 544 West 79th. Chicago 20.

AGENTS—300% profit selling genuine gold window letters; stores and offices. Free samples. Metallic Sign Letter Co.. 431-E North Clark. Chicago.

NEW Jobs open in selling! Send name. address for five free issues of Opportunity Magazine's money-making guide. Listing hundreds of companies who'll pay you well. full or part-time. No experience needed. Opportunity. 28 E. Jackson. Dept. 18. Chicago 4. Illinois.

START Your Own Business on credit. Your own boss. 1586 of our Dealers sold $5.000 to $27.500 in 1951. We supply stocks. equipment on credit. 200 home necessities. Sales experience unnecessary. Pleasant. profitable business backed by world-wide industry. Write Rawleighs. Dept. L-U-PSC. Freeport. Ill

FAST sellers. Big demand. Catalog. Parker Drug Co.. Hoboken 6. New Jersey.

FREE Book where to buy 800.000 articles from manufacturers at Wholesale Prices. Save up to 50% on Nationally Advertised Merchandise. Rush name for Free copy. Glass Pub. Co.. Ellwood City 1. Penna.

BIG profits selling ties ($2.00 values) $6.50 dozen. Free catalog. Empire Cravats. 648A Broadway. New York 12.

BE A Money Maker . . . Represent magazines year around. Wonderful home work. Big Christmas profits now. Liberal commissions. Everything furnished. Write for Free Catalog. McGregor Magazine Agency. Dept. 510A. Mount Morris. Illinois.

"FOG-Stop" Windshield Cloth. Instantly removes blurry Mist. Frost. Sleet. Snow. Stops windshield fogging. Samples sent on trial. Kristee 153. Akron. Ohio.

BUY Wholesale—25.000 items—Catalog 25c. Matthews. 1472-A3 Broadway. New York City 36.

$200 WEEKLY. New invention. Amazing 4-second Presto Emergency tire chains. fit all modern auto wheels. National advertising building big demand. 3 sales daily to oil stations. dealers. etc.. make $200 or more weekly. Territory going fast. Write Presto Chain Co.. P-16. Des Moines 2. Iowa.

PRINTING — Salesbooks — Envelopes. Free Illustrated Catalog—Ersco. Dept. PS. Bronx 72. New York.

TAKE Large Unit Orders for Wool Uniforms. Caps. Shirts. Ties. Wallets. Personal Initialed Buckles With Belts. Cap Badges. 3000 Emblems. Send For Free Outfit Now! Hook-Fast Co.. Dept. PS. Roanoke. Virginia.

BUY Wholesale thousands nationally advertised products at big discount. Sent free "The Wholesale Plan." American Buyers' Service. 629-S Linden. Buffalo. N. Y.

SELL Better Nutrition to families with inadequate Vitamin and Mineral diets and become financially independent. Send today for proof of earnings and free Nutrition Booklet. Vitmora Co.. Dept. PS-12. 109 So. Adams Street. Glendale 5. Calif.

1 CENT Each in quantity. Beautiful miniature toys. Terrific profits. Sell stores. mail order. homes. Send $1.00 for 50 assorted samples. Money back guarantee. Morael Mfg. Co.. Box 115-J. Rockaway Park 94. New York.

CALENDARS. Advertising Novelties. Matches. All styles. including Religious. Varnished. 12 sheet. Girls. Hundreds of Advertising Novelties. Book Matches. etc. Fleming Calendar Co.. Promotional Division. 6539 Cottage Grove. Chicago 37. Ill.

MAKE Extra Cash every day. Free illustrated Catalog shows how. Stephen Products. 1947 Broadway. Dept. C. New York 23.



Copyrighted material

# POPULAR SCIENCE OPPORTUNITIES

CHANCE to earn $25.00 to $50.00 daily, sell stores or door to door, sensational new item, no competition, nothing like it in America. Full time or sideline. Write for free information. Please don't write from California. State fully covered. The A. P. King Company, 1745 Jefferson, Napa, California.

STRANGE "Dry" Window Cleaner. Sells like wild. Replaces messy rags, liquids. Simply glide over glass. Samples sent on trial. Kristee 154, Akron, Ohio.

YOUR photo on stamps! 300% profit. No investment. Free samples! Details! Special offer! Send photo (returned unharmed) and 65c for sheet of 100 photostamps. National Photostamp, 1418-S, 3rd Avenue, N.Y.

CALIFORNIA sweet smelling beads, sensational sellers. Particulars free. Mission, 2328P West Pico, Los Angeles 6, Calif.

SELL Big Money-Maker to Men and Women. Easy handwork makes fast-selling useful articles. Sample free. Sunmade Company, Brockton 64, Mass.

BE Your Own Boss! Free Book "301 Unique, Successful Businesses" tells how. Start spare time, small capital, work home. Deumant Publications, 81-T Deumant, Kenmore 23, New York.

ABSOLUTELY Free—Sales Kit. Sell personal initialed buckles with belts, cap badges, tie clasps, etc. Choose from 3000 emblems. Hook-Fast, Box 1425PS, Providence, R. I.

A Postcard Can Put You In A Fine Business! Complete line. Leather jackets, 151 shoe styles. Big commissions. No experience, no investment. Send postcard for Free outfit. Mason Shoe, Dept. MA-17, Chippewa Falls, Wisc.

MEXICAN Feather Pictures. Sell on sight; 200% profit! Free details. Sample 20c stamps. (No Coins). Sylvias, Apartado 9036, Mexico City.

SALESMEN, Distributors, fast selling costume jewelry direct from factory. Big picture catalog free. Pickcraft, C-19 Bank, Attleboro, Massachusetts.

FREE book "505 Odd, Successful Businesses." Work Home! Expect something Odd! Pacific-38C, Oceanside, Calif.

NEW Plastic ties. (Ready tied 4 in hand) Unique, attractive, long lasting. Fast sellers anywhere. Send $1.00 for sample or $7.20 dozen. Leader Plastic Products, Capac 2, Michigan.

POSITIVELY Make $50.00 a day and up selling brand new item going to every type of Food and Beverage Store, Factories, Laboratories, Hospitals, etc. Samples furnished. Utility Durawear, 53 West Jackson Blvd., Dept. PS-12, Chicago 4, Ill.

OPERATE "Escalator" Mailorder system, selling our products or any products. Fastest, most revolutionary mailorder system known. Write: Selbyco, Decatur 175, Ill.

MAGAZINE Subscription, Agents Bonus Arrangements. Qualified Readers Service, 451 Kingston, Brooklyn 25, New York.

MAKE Money Introducing World's cutest children's dresses. Big selection adorable styles. Low prices. Complete display free. Rush name. Harford, Dept. J-1341, Cincinnati 25, Ohio.

## 44 HIGH-GRADE SALESMEN

ADVERTISING book matches—Cash in on big demand—sell Union Label matches. Cuts for all businesses and political parties—Free powerhouse selling kit—low prices—protection guaranteed on repeat orders—Cash commissions. Superior Match Co., Dept. P-1252, 7530 Greenwood, Chicago.

AD Matches! Sell Amazing Designs—20, 30, 40 and 240-light book matches. Biggest spot cash commissions; every business a prospect. Low prices for high quality. Repeats. Start without experience; men, women; full, part time. Buy Nothing! Sales kit furnished. Match Corp., Dept. PS-36, Chicago 32, Illinois.

## 45 EDUCATIONAL & INSTRUCTION

LEARN Piano Tuning, Repairing—at home in 30 days. Unlimited income. Phonograph recordings, tools and instructions furnished. Write Capitol City Tuning School, Department C-1233, 129 East Michigan, Lansing 16, Michigan.

PIANO Tuning Pays. Learn this profitable profession at home. Our Tonometer and mechanical aids make learning easy. No knowledge music necessary. Diploma granted. Largest and oldest school—55th year. G. I. Approved. Write for booklet. Niles Bryant School, 77 Bryant Bldg., Washington 16, D. C.

USED Correspondence Courses and Books sold and rented. Money back guarantee. Catalog free. (Courses Bought.) Lee Mountain, Pisgah, Alabama.

HIGH School—No Classes. Study at home. Spare time. Diploma awarded. Write for Free catalog. HBA-19, Wayne School, 2527 N. Sheffield, Chicago 14, Ill.

WANT A Diesel Job? New Opportunities to increase income. Higher Pay. More Money. We can help you Qualify. Tools. Shop method home training. Write today! Diesel, Tractor, Heavy Equipment Division, Interstate Training Service, Dept. 2-N, Portland 13, Oregon.

BECOME a Doctor of Psychology or Metaphysics. Learn secret of contentment, happiness. Win degree of PsD. or MsD. Solve mental worries. Free book. College of Universal Truth, 5153-K N. Clark, Chicago.

BOOKKEEPERS! Increase your earnings! Operate your own simplified "Dollar-A-Week" Bookkeeping and Tax Service. Full or spare time. Details Free. No obligation. Ellis, Box 203-N, Cedar Grove, North Carolina.

COMPLETE Your High School at home in spare time with 55-year-old school. Texts furnished. No classes. Diplomas. Information booklet free. American School, Dept. X946, Drexel at 58th, Chicago 37, Ill.

HYPNOSIS and Self-Hypnosis, complete course. Free details. Columbia Company, 5864-A Hollywood Blvd., Hollywood 28, Cal.

MEDICAL Laboratory Technicians in great demand. We train you in your own home. Catalogue free. Imperial Technical Institute, Box 973-B, Austin, Texas.

WANT To Make More Money? Have a real career with a lifetime of high salaries? I'll show you how to succeed in the growing radio-television field that needs men. Write Ed Howes, Chief, Dept. 7122, 4000 So. Figueroa St., Los Angeles 37. No obligation.

YOU For President Of Your Own Credit-Collection Agency. Many who answered our ads now have their names on office doors. Franklin Credit, Roanoke 7, Va.

HYPNOTISM. Sample lesson Free! Write Baltimore School of Hypnotism, Dept. 212A, 4214 Belmar Avenue, Baltimore 6, Maryland.

WELDING training pays at Hobart Welding School, Box P-1222, Troy, Ohio. VA Contract. Best equipment. Catalog Free.

INCREDIBLE! Unprecedented! Look under "Personal"! Bijou, Box 1727-VZ, Hollywood 28, California.

BOOKKEEPING—Complete self-check course with solutions only $9.95. Consultation service with Certified Public Accountant. Write for information, or send 50 cents for bookkeeping adaptability test including grading service—P. D. Lipscomb, 6609 Avondale Drive, Oklahoma City, Oklahoma.

HYPNOTIZE! Free Picture Booklet describes fast, practical course. David Stewart, Dept. 52, Post Office, Malvern, Ontario, Canada.

ESTIMATING Building Construction. Home study course. For full particulars write, Quantity-surveyor, 1016 Coolidge Drive, San Gabriel, California.

OPPORTUNITY without end! Industry is constantly absorbing more trained Electronic and Instrument Technicians than we can graduate. Start studying for a future in Electronics now. For information, write the Ward School of Electronics, 44 Niles Street, Hartford 5, Connecticut.

PEACE officer positions! Prepare now for coming examinations. U.S. Deputy Marshal, Port Patrol Inspector, Inspectors of Immigration, Customs, Liquor, Border Patrol, Police, Highway Patrol, many others. These positions offer good pay, security, sick leave, paid vacations, promotions, annual increases, pensions. Write today. State age, occupation. Peace Officer Training, Box 3121-B, Seattle 14, Washington.

BE a Real Estate Broker. Study at home or in classrooms in leading cities. Write for Free Book today. Weaver School of Real Estate, 301 Law Bldg., Kansas City, Missouri.

STAMMERING and Stuttering can be corrected. Instructions $1.00. John Thompson, Gastonville, Pennsylvania.

HYPNOTISM, free books. Write for details. Collins, Box 5207, San Francisco 1, Cal.

BECOME Expert Draftsman At Home. Monroe Institute, PS-12, Alton, Illinois.

USED Correspondence Courses and Educational Books Bought, Sold, Rented. Catalog Free. Educational Exchange, Summerville, Georgia.

YOU can get on television. Send $1.00 for step by step method to T.V.—Porter, Route 1, Box 758, El Cajon, Calif.

APPROVED For Korean Vets and All G.I. Bills. Drafting-Design, Aircraft, Mechanical, Electrical, Architectural, Structural, Building Constructions Estimating, Blueprint Reading, Mathematics—Refresher & Higher, Surveying. Prepare for Licenses—Professional Engineer, Architect, Stationary Engineer, Refrigeration, Electrician. Mondell Institute, 230 West 41st St., New York. 40 Years Preparing Thousands for Technical & Engrg Positions.

COLLEGE Of Medical Allied Sciences. Medical Laboratory, Clinical Psychology, Physio Therapy, Practical Nursing. Residence and correspondence students. 346 Adams, Montgomery, Alabama.

LEARN Blueprint Reading this simplified way. Actual blueprints from established office. Send $2.00 now for your "Essentials Of Blueprint Reading". Technical Drafting Studio, P.O. Box 401a, Rockville Centre, New York.

PREPARE for Civil Service Examination, you can pay for course after securing position. Write, Free School, Dept. PS-12, Kokomo, Indiana.

## 46 CONTESTS

TIE-Breaker picture puzzles exposed, $2.00. Wenograd, Box 1495, Philadelphia 5, Penna.

ONLY sure system, win unicorn tiebreakers, send stamped envelope. Box 1174, Chicago 90, Illinois.

$100,000-CONTESTS. Puzzle, Tiebreaker helps. Free details. Contests, 13A Earl, Red Bank, New Jersey.

## 47 DETECTIVES

DETECTIVE Training. Phillips Secret Service System, 1917-C North Kenneth, Chicago 39, Ill.

DETECTIVES—Work home—Travel. Experience unnecessary. Detective Particulars free. Write, Wagoner, P-125 West 86th, New York 24.

DETECTIVE Training Course, only $12.00. Diplomas awarded. Details free. Virginia Detective Agency, Hampton, Va.

## 48 LANGUAGE OUTFITS

LISTEN—Learn A Language by Linguaphone At Home. Master Spanish, French, German, Russian, Japanese, Norwegian—any of 29 languages through Linguaphone Conversational Method. Save time, money. Send for free book. Linguaphone Institute, 5412 Radio City, New York 20.

## 49 REWEAVING

$5.00 HOUR possible, spare, full-time at home. Instructions shipped by recognized authority for no-risk examination. Men-women reweave burns, tears, moth-holes, like new. Free details. Skil-Weave 37C, Los Angeles 24.

## 50 BUSINESS SERVICE, INFORMATION, NAME LISTS

MAILING Lists. All kinds 1000 $5.00. Dixie Service, King, N. Carolina.

1,000 NAMES $3.00. James Olson, Box 513, Northwood, North Dakota.

MAILING list of 500 women mail buyers $1.50. Lincoln Supply, Box 449, Irwin, Pa.

MAILING Lists 1000—$4.50. Canadart, Box 66, Station "D," Toronto, Ontario.

MAILING Lists. Any State 1000—$5.00. List your needs. Mailo, 3156 Black Court, Wichita 10, Kansas.



Copyrighted material

# POPULAR SCIENCE OPPORTUNITIES

## 51 SPECIAL SERVICES

ALASKAN remails—Fairbanks, Anchorage, Nome, Ft. Yukon. Your stamped letter remailed 50c. Use airmail. Arctic Remail Service, Box 254, College, Alaska.

## 52 AUTHORS SERVICE

I Want New Writers to cash checks of $1 to $100 offered daily. The easiest way to write for pay. No previous experience necessary. Free Details. Saunders M. Cummings, 6840 Odin St., Studio 15, Hollywood 28, California.

NO Luck finding a book publisher! Write for Free Booklet PS. Vantage Press, 120 West 31st, New York.

BEGINNING Writers: Get $1 to $20 checks daily writing simple children's stories, articles, poetry in your sparetime. Experience unnecessary. Our instructions reveal how. Details Free. W. Herman, 7016 Euclid, Cleveland 3, Ohio.

## 53 ADVERTISING

ADVERTISE: 24 words, 100 Canadian Newspapers, $5.50. Lists Free. Advertising Bureau, 10511-P Springfield, Chicago 43.

## 54 CARTOONING, SIGN PAINTING, CHALK TALKS

"HOW To Make Money With Simple Cartoons"—A book everyone who likes to draw should have. It is free; no obligation. Simply address Cartoonists' Exchange, Dept. 1912-C Pleasant Hill, Ohio.

9 ALPHABET 3. Numeral pattern sets and raised wood letter catalog $1.00. Sign Letter Distributors, P. O. Box 101, Mineola, New York.

GAGWRITERS, cartoonists needed. Beginners welcome. Free details. "Cartooning," LaHabra, Calif.

MY Criticism Service offers reproduction of drawing in a market bulletin, if drawing meets professional standards. 25c brings information and agreement forms. James Burroughs, Oak Street, Conway, South Carolina.

CARTOONISTS: amateur and professional. If you can draw, sketch or even trace, you can prepare yourself for the unprecedented television demand for men and women with some knowledge of animation. The famous pioneer, Max Fleischer, has designed an inexpensive, authentic outfit for home study. Address: Vera Coleman, Secretary, 60 East 42nd Street, New York, N. Y.

FLUORESCENT Chalk. Nine colors for signs, art work, chalk talks, shine brilliantly in daylight or under black-light. Send $1.00 for complete set. Shannon Luminous Materials Co., 7356 Santa Monica Blvd., Hollywood 46, California.

LEARN Sign Painting at Home. Test Lesson Free. Ben Kerns, Box 812-PS, Greenville, South Carolina.

CHALK Talks. Laugh Producing Program. $1.00. Illustrated Catalog 10c. Cartoonist Balda, Oshkosh, Wisconsin.

## 55 TYPEWRITERS & OFFICE MACHINES

TYPEWRITER Sale! Adding Machines! Save up to $20—New Portables, reconditioned typewriters. Send 10c for catalogues. Apple, 993A Westchester Ave., New York 59, N. Y.

TYPEWRITER $22.50. Adders, Duplicators $12.95. Meier's, 118 Spruce, Wichita 7, Kansas.

## 56 RUBBER STAMPS & OFFICE SUPPLIES

RUBBER Stamps, Printing. Catalog Free. Morey's, 2529-S Roosevelt, Redwood City, California.

3 LINES $1 knob style or pocket stamp. Anderson, 1704 5th Avenue East, Hibbing, Minnesota.

2 LINES 45c; 3-65c; Pad 40c; Signature $2.35. Print-Right, Wauwatosa, Wisconsin.

## 57 PRINTING, MULTIGRAPHING, ETC.

125 8½x11 LETTERHEADS and 125 envelopes $2.00 postpaid. 24 hour service. Samples free. Catalpa Press, 5519 N. Clark, Chicago 40, Illinois.

1000 BUSINESS Cards $2.50 Prepaid samples Free. Reliable Print Shop, 907 East Jefferson, Louisville 6, Ky.

FINE Printing—Prompt service—Wide selection modern type styles, colors, cuts. Free samples, prices. Wilcox, Nicholls, Ga.

PRINTING that pleases. Send copy for estimate. Samples, prices. Mercury Press, Box 69P, Marengo, Iowa.

TWO-Color Letterheads, 8½x11. 100—$1.50. Samples. D'Yarmett Service, Newark, Ohio.

## 58 PRINTING OUTFITS, SUPPLIES

DO your own printing. Save money. Simple rules. We supply everything. Print for others; good profit. Raised printing like engraving, too. Have home shop. Details free. Kelsey Presses, V-8, Meriden, Conn.

MAKE your own, self-molding, rubber printing cuts. Plexirubber, Argyle 2, Wisc.

PRESSES, Supplies. Paper catalog 10c. Custom, Box 211-S, Springfield, Missouri.

PRINTING Presses, Type Supplies. Lists 3c. Turnbaugh Service, Loysville, Penna.

## 59 PATENT ATTORNEYS

INVENTORS: Learn how to protect your invention. Special booklet "Patent Guide for the Inventor" containing detailed information concerning patent protection and procedure together with "Record of Invention" form will be promptly forwarded to you upon request—without obligation. We are registered to practice before the U.S. Patent Office and prepared to serve you in the handling of your patent matters. Clarence A. O'Brien & Harvey Jacobson, Registered Patent Attorneys, 22B-K District National Building, Washington, D.C.

INVENTORS. For "Invention Record" form, contact Carl Miller, Registered Patent Attorney, Woolworth Building, New York.

INVENTORS: When you are satisfied that you have invented something of value write me, without obligation, for information as to what steps you should take to secure a Patent. Write Patrick D. Beavers, Registered Patent Atty., 938 Columbian Bldg., Washington 1, D. C.

C. A. Snow & Co.—S-427, Snow Building, Washington 1, D. C. Registered Patent Attorneys. Write for information.

INVENTORS: Without obligation, write for information explaining the steps you should take to secure a Patent. John N. Randolph, Registered Patent Attorney, 207 Columbian Bldg., Washington 1, D. C.

INVENTORS—If you consider your invention to be something of importance, take steps to protect it with a United States Patent which gives you the right to exclude others from making, using and selling your invention as claimed. "Patent Protection for Inventors" outlines steps to take to secure patent protection. Mailed promptly without obligation. Victor J. Evans & Co., Merlin M. Evans, Registered Patent Attorney, 741-P Merlin Building, Washington 6, D. C.

INVENTORS—If you believe that you have an invention, you should find out how to protect it. The firm of McMorrow, Berman & Davidson is qualified to take the necessary steps for you. Send for copy of our Patent Booklet "How to Protect Your Invention" and "Invention Record" form. No obligation. McMorrow, Berman & Davidson, Registered Patent Attorneys, 1432 Victor Building, Washington 1, D. C.

"INVENTOR'S Guide" free. Frank B. Ledermann, Registered Patent Attorney, 154 Nassau Street, New York.

PATENTS—Irving L. McCathran, 316 McLachlen Bldg., Washington 1, D. C. Registered Patent Attorney.

## 60 FOR INVENTORS

INVENTORS. For "Invention Record" form, contact Carl Miller, Registered Patent Attorney, Woolworth Building, N. Y.

INVENTORS: Without obligation, write for information explaining the steps you should take to secure a Patent on your invention. John N. Randolph, Registered Patent Attorney, 206 Columbian Bldg., Washington 1, D. C.

SEARCHES—Put your patent searches in the hands of a Registered Patent Attorney or Agent, as he qualifies to give a worthwhile patentability report. Record of invention form upon request and information on patent protection. Patrick D. Beavers, Registered Patent Attorney, 939 Columbian Bldg., Washington 1, D. C.

INVENTORS: If you have an invention for sale, patented or unpatented, write Institute of American Inventors, Dept. 30A, 631-E St., N.W., Washington 6, D. C.

INVENTORS! For "Copyright, Design & Patent Guide" contact Mr. Metzlerr, 11 West 42nd, New York 18.

INVENTIONS Promoted. Patented or Unpatented. Established 1911. Write Adam Fisher Company, 183 Enright, St. Louis, Mo.

INVENTORS: Learn how to protect your invention. Special booklet "Patent Guide for the Inventor" containing detailed information concerning patent protection and procedure together with "Record of Invention" form will be promptly forwarded to you upon request—without obligation. We are registered to practice before the U.S. Patent Office and prepared to serve you in the handling of your patent matters. Clarence A. O'Brien & Harvey Jacobson, Registered Patent Attorneys, 22A-K District National Building, Washington, D.C.

INVENTORS—If you consider your invention to be something of importance, take steps to protect it with a United States Patent which gives you the right to exclude others from making, using and selling your invention as claimed. "Patent Protection for Inventors" outlines steps to take to secure patent protection. Mailed promptly without obligation. Victor J. Evans & Co., Merlin M. Evans, Registered Patent Attorney, 742-P Merlin Building, Washington 6, D. C.

PATENT Searches $5.00, including patent copies. Same reliable search as conducted for patent attorneys. Free protection forms. 48 hour service. Patent Service Institute, 945-B Pennsylvania Avenue, Washington 4, D. C.

INVENTORS—If you believe that you have an invention, you should find out how to protect it. The firm of McMorrow, Berman & Davidson is qualified to take the necessary steps for you. Send for copy of our Patent Booklet "How to Protect Your Invention" and "Invention Record" form. No obligation. McMorrow, Berman & Davidson, Registered Patent Attorneys, 1431 Victor Building, Washington 1, D. C.

"INVENTOR'S Guide" free. Frank B. Ledermann, Registered Patent Attorney, 154 Nassau Street, New York.

INVENTORS: Cash-in on your ideas and inventions. Join the National Inventors Institute, 4097 East 131st St., Cleveland 5, Ohio. Only $5.00 per year. Write for your free copy of "Inventioneering."

IDEAS, protected, developed, marketed. Nor-Wal Enterprises, Box 166, Rochester 1, New York.

INVENTORS:—"Poor Man's Tale of A Patent" by Charles Dickens. Reprint of story written in 1850 by famous author. Single copy 25c. In Re Publications, 4627 Verplanck Place, Washington 16, D. C.

PATENT Searches $5.00. 48-hour service. Patent Applications and Drawings prepared. Record of Invention forms free. Write Miss Ann Hastings, P.O. Box 176, Washington 4 D.C.

INVENTORS! Idea Men! Complete Lists, all manufacturers in U.S. making related products! 5c per name, gummed labels. Minimum, 100 names. Notturno, 1104 West Broadway, Hewlett, N. Y.

CASH For your ideas. 280 Manufacturers need inventions, patented or unpatented. List free. Invention Bureau, 208-S Clinton, Oak Park, Illinois.

## 61 INVENTIONS WANTED

INVENTIONS promoted. Patented or Unpatented. Established 1911. Write Adam Fisher Company, 183 Enright, St. Louis, Mo.

INVENTORS: Hundreds of manufacturers have requested our assistance in locating marketable new products. Complete information, free. Institute of American Inventors, Dept. 30C, 631—E Street, N.W., Washington 4, D. C.



Copyrighted material

MARKETING Aid—Nation Wide. Patented, patent pending. Booklet free. Market Contacts. 719-B2, Magnolia, Tupelo, Mississippi.

INVENTIONS sold on percentage basis. No fees, anytime. Send descriptions, no obligation. Comercial Development, 46 Greenfield, Vallejo, California.

INVENTIONS Wanted. Patented or Patent Pending. 21 years experience Promoting Inventions. National Service Bureau, 3122 Meramec, St. Louis 18, Mo.

INVENTIONS wanted. Patented; unpatented. Tremendous Manufacturers lists. Global Marketing Service, 1404 Mitchell, Oakland 1, Calif.

CASH buyers for ideas and inventions. Write National Inventors Institute, 4097 East 131st St., Cleveland 5, Ohio.

## 64 MODELS, MODEL SUPPLIES

SHIP and Yacht model fittings: blueprints. Send 25c for illustrated catalog No. 27—Listing hundreds of items. A. J. Fisher, 1002-2 Etowah, Royal Oak, Mich.

FAMOUS Model Catalogs: Ships, Fittings, Hints, 169 pgs. 50c; Worlds Tinplate Trains, 148 pgs. 50c; H.O. Trains—Manual, 140 pgs. 50c. Each includes 50c refund coupon. Also Collectors Soldiers 25c; Old Time Autos, 15c; 100 model projects, 10c. Polk's, Dept. P-22, 314 5th Avenue, New York City 1.

SHIP Model and yacht supplies, complete large 64 page catalogue, 30c. Wm. Wild, 510 E. 11th St., New York City.

POWER Models. Unusual steam, gasoline and traction engines. Metals, tools, accessories. Catalog 50c. Charles Cole, Ventura, Calif.

LIONEL and American Flyer Catalogs 20c. Shannon's, 503 Franklin, Nutley, N.J.

NEW catalog 5000 craft items, model cars, airplanes, boats, leathercraft. Send 25c. Shelart, 6th Street South, St. Petersburg, Florida.

BUILD miniature homes with our accurately-scaled materials. Send 25c for booklet and samples. Architectural Model Materials Inc., Dept. S122, 4208 Armitage Avenue, Chicago 39.

STOP! Before you buy electric trains, send for 4-color illustrated Reference Guide to Lionel and American Flyer Trains and all available accessories. Packed with information, track-layout ideas, wiring diagrams. New! Different! Only 50c. Hobby House, Inc., Dept. AZ, 800 Huron Road, Cleveland 15, Ohio.

STEAM engines, boilers, castings. Catalog 25c. Anton Bohaboy, 2297 Price, Rahway, New Jersey.

WORLD'S Finest Illustrated Catalog-Handbooks. Railroads 92 pages 35c. Airplanes, Boats, Crafts, Hobbies, Tools 60 pages 25c. No Stamps. Print Name. E and H Model Hobbies, Room 80, 130 W. Chelten Avenue, Philadelphia 44.

## 65 HOME CRAFTSMAN

LEATHER, tools, lacing, supplies. Free Catalog. National Handicraft, 199 William St., New York 7.

89 FULL size Jig Saw patterns of beautiful shelves, ornaments, toys, novelties. Plus "How, Where to Sell." Only $1.00. Mastercraft 124S, 7041 Olcott, Chicago 31, Ill.

OUR biggest Leather and Craft Catalog yet! 1000's of items. Send 25c (refunded with 1st order). Russo Handicraft Supplies, Dept. 103, 245 S. Spring, Los Angeles, California.

"PRACTICAL Painting, Wood Finishing" shows how to get professional results. Furniture finishing, workshop projects, home decorating. Complete Modern brush and spray methods. Tricks you've never seen. Write Home Craftsman, 115-F Worth St., N. Y. 13.

LEATHERCRAFT, Copper Tooling, Textile Painting, Beadcraft, Shellcraft. Many other crafts. Big Free catalog shows everything you need. Kit Kraft, 7373 Melrose, Hollywood 46, Calif.

ART—Craft Books and Supplies. Catalog, 10 cents. Artcraft, Baldwin, Maryland.

TOOLING Copper. Free Instructions. Flock, Tools, Finishes. Bestcraft, 949 Kenwood, Inglewood, Calif.

LEATHERCRAFT For Pleasure or Profit. Make easy-to-assemble purses, belts, gloves, woolskin toys, 100 other items for gifts or to sell. Send 10c today for big catalog. Largest Leathercraft stock in U.S. J. C. Larson Co., 820 S. Tripp, Dept. 2754, Chicago 24.

"TOPS" In everything for leathercraft. Low priced kits, leathers, tools, lacing. Catalog 10c. Crown Leathers, 22 Spruce Street, New York 38.

90 ALL new full size lawn ornament and novelty patterns, up to 20" high. Only $1.00. Mastercraft 122S, 7041 Olcott, Chicago 31, Illinois.

KNOCKDOWN Cedar Chest. Lumber and Veneers. Free Price List. Giles Co., Brownsboro, Alabama.

LEATHERCRAFT. New Stylecraft folder Free. New Kits illustrated. Filigree Belts, Billfolds, Purses, etc. Send 25c new catalog. Refunded first order. Apache Leather Co., 2804 East Washington St., Phoenix, Arizona.

HOMECRAFTSMEN—No shop complete without Jet Jr. Combination Moulding & Dado Head. Quickly converts your saw for shaping, fluting, beading, jointing, door lipping, moulding, rabbetting, grooving, etc. and dadoing. Large variety low cost cutters available as needed. Send today for Free catalog. Jet Tool Co., Dept. PS, Lemon Grove, California.

WHITTLE Kit—White pine jigsawed figure (buffalo, kitten, dog, horse, or bird). "Popular Mechanics Whittling Book," instructions. $1.00. Additional figures. 75c. Featherfoot Industries, Kings Street, Wabash, Indiana.

KNOCKDOWN cedar chests and lumber. Free list. Bedford Lumber Company, Shelbyville, Tennessee.

LEATHERCRAFTERS: Big illustrated catalog of materials, tools, kits, 10c. Art's Leather, 411 Joseph Ave., Rochester 5, N.Y.

LEATHERCRAFT Tools, Leather Embossing Plates, Craft Accessories, Dies. Catalogue 10c. Louis Jones Engineering Company, 1613 Main, Fort Worth, Texas.

FULL size homecrafter patterns. Illustrated folder 10c. Willard's, Canoga Park 12, California.

5-IN-1 Saw: panel, crosscut, keyhole, dovetail and hacksaw. Every home handyman needs one. See it first, then send $3.95 full payment or return saw. Gercke, 8 Woodside, Malverne, New York.

KNOCKDOWN Cedar chests. Write for free literature. Cedarcraft, Fayetteville, Tennessee.

100 FULL size Jig Saw patterns up to 20" high, only $1.00. Pattern Service, Medway 8, Mass.

SQUAREKNOTTERS: Make belts, handbags, lanyards, dog leashes, etc. Special offer! Beginner's book, catalog and quality cord samples 15c. P. C. Herwig Co., Dept. P41, 121 Sands St., Brooklyn 1, New York.

LEATHERCRAFT Tools, Lacings. H. Byrd, 3406 Montrose Avenue, Richmond, Va.

WILD Animals! Ancient Locomotives! Six-foot Train! 34 quality Jigsaw Wall Patterns, 50c! Pauls Plans, 2233A N. 35th, Milwaukee 8, Wisconsin.

ENJOY leathercraft at home. Make leather belts, billfolds, purses during your spare time. They make excellent Christmas Gifts. Start ordering your supplies and tools today. Free Catalog. Tandy Leather, Box 397-D, Tulsa, Oklahoma.

## 66 BUILD IT YOURSELF

PLANS prepared for homes and motels. H. C. Lightfoot, Civil Engineer, Richboro, Penna.

STREAMLINED Built-in kitchen cabinets fit any kitchen. Illustrated manual describes designing and construction. All for $1.00. Thombert Company, Newton 11, Iowa.

BUILD Inexpensive, fast production. Concrete Block Machine. Motor or hand. Write, Clyde Lee, Mountain View 1, Okla.

BUILD beautiful chrome circline fluorescent kitchen light with new "Electrokit". Instructions and lamp furnished $7.95 postpaid. Industrial Electric, Allegan, Michigan.

SEND for big new 1952 illustrated catalog that will show you how to turn your spare time into cash—making quick-selling, highly profitable lamps. Every home a prospect. Hundreds doing it—you can, too. No experience or special tools required. Catalog No. 7 contains 56 pages filled with shades, shade frames, figurines and bases, oil lamp converters, boring compound and dozens of similar items. Also all kinds of sockets, cords, pipes, harps, finials, bases and hundreds of other parts—everything you need. Special 8-page section shows 6 beautiful lamps in kit form—ready to assemble. You buy wholesale, sell at retail—make Big profits. Send 25c today for new 1952 catalog and wholesale price list—you'll be glad you did. The 25c will be refunded on your first order. Gearon Co., Dept. 500-A12, 28 S. Desplaines, Chicago 6, Ill.

BUILD Your Own "Tractor". Free information. Eltraco D-5, Camptonville, Calif.

MODERN Furniture — Prefabricated — save $$$$—you assemble. Artcraft, East Peoria, Illinois.

BUILD your own power tools, save 90%, handbook 25c. Robert Fellows, Caledonia 4, New York.

BUILD with Concrete, Fieldstone, Earth. Movable form system cuts costs. Construction simplified. Free literature. Smith PS, Box 36, Eagle Creek, Oregon.

POWER Tools build nine from vacuum cleaner motor. Instructions $1.00. R. Hill, Box 358, Lee, Mass.

"CONCRETE Block Homes." 32-page booklet, on how to build, $1.00. H. C. Lightfoot, Civil Engineer, Richboro, Penn.

FREE handbook, build sawmills, block machines, freezers, tractors, scooters. Nichols Company, Purvis 3, Mississippi.

RACING Toboggan combination brake and steering attachment. For coasting and jet propelled toboggans. Plans and specifications for brake attachment, sketches on jet installation, cost $2.00. Trans World Novelties, 2425 231st, Torrance, Cal.

PEDAL type toy train. Send 10c for folder describing train and blueprints. Hen-Lee Products, 1116 Turner Road, Lodi, California.

## 67 OLD GOLD, JEWELRY, WATCHES, ETC.

HIGHEST Cash Paid For Old, Broken Jewelry, Gold Teeth, Watches, Silverware, Diamonds, Spectacles, Platinum. Free information. Satisfaction Guaranteed. Rose Smelting Company, 29-Y East Madison, Chicago.

JEWELRY making. Send 20c for illustrated catalog. Milady-Fair Co., G.P.O. 1328, New York City 1.

5000 JEWELRY styles you can easily make yourself—Pins, Earrings, Bracelets, Rings, matched ensembles. Instructions and catalog 10c. Barrys, 126 Ardsley Court, Newark, N. J.

RHINESTONES. Jewelry for hobbyists. Free Catalog. Sexton's, 348 W. Ferry, Buffalo, New York.

WATCHMAKERS' — Jewelers' complete informative catalogue 20c. Bengal Company, Culver City, California.

OLD Gold Wanted. Highest prices paid on old or broken watches, diamonds, spectacle frames, dental gold and platinum. Cash by return mail. Information free on request. Alamo Watch Company, Second Floor, Melrose Building, Houston 2, Texas.

EXTRA Money for you between now and Christmas. Make smart looking jewelry that Sells Fast. We supply Rhinestones, jewelry settings, cameos, sequins, beads. Send 10c for illustrated Catalog. J & M Novelties, Dept. CP-4, Griffith, Indiana.

BUY Popular Priced costume jewelry wholesale. $2.00 brings three boxed samples. Bryant, 711 Morris, Grand Rapids 3, Michigan.

## 68 TOBACCO & PIPES

CIGARS, smoke three, if not completely satisfied return balance for full refund. Custom-made, mild, fine taste. Havana filler, blunts, 4¾" long, ⅝" diameter. 50 —$4.95 postpaid. Desmar Tobacco Company, 475 Fifth Avenue, New York City.



Copyrighted material

100 CIGARS. $4.75 postpaid. Packed 25 in vacuum tin, all Havana filler, money-back guarantee. Others. Ace Mail Order Co., East Orange 2, New Jersey.

## 70 OF INTEREST TO WOMEN

NEW catalog 5000 craft items, shellcraft, leathercraft. Send 25c. Shelart, 6th Street South, St. Petersburg, Florida.

LADIES Earn Extra Cash—by addressing Postcards at home. Write Lowell Press, Muncie, Indiana.

## 71 FOR SALE MISCELLANEOUS

FREE catalog on government surplus bargains from country's largest surplus organization specializing in outdoor sporting goods, clothing, camping equipment. Tents, rubber boats, tarpaulins, hundreds of other items. Rockaway Sales Co., Route 6, Rockaway 8, New Jersey.

REACTION Time Indicator Test your speed. Easy to use—Simple in construction. Complete 75c. Box 4081, Dundalk, Md.

## 72 WANTED MISCELLANEOUS

SCRAP Mercury (Quicksilver) Tantalum—Bismuth—Tungsten. Metallurgical Products Co., Established 1909, 35th & Moore Sts., Philadelphia 45, Pa.

WE buy used plating equipment. Send description. Hollywood Bronze Supply, Dept. RR, 1624 East First Street, Los Angeles 33, Calif.

## 73 WEARING APPAREL

BUCKSKIN Jackets 30 in. length, lined and fully fringed in old Frontiersman Style. Sizes 34 to 50. $45.00 postpaid. Money-back guarantee. H. H. Redhouse, 5605 Wentworth So., Minneapolis 19, Minn.

## 75 TATTOOING SUPPLIES

TATTOOING Course and Supply Brochures. 25c. Zeiss School, 728 Lesley, Rockford, Illinois.

## 76 DRAWING, SUPPLIES & EQUIPMENT

DRAFTING and artists' materials catalog—thousands of items—25c (deductible first $2 order). Gordon's, 219 Madison, Chicago.

ATTENTION: Draftsmen, Engineers, Students—Limited openings for agents. Take orders in spare time on drafting supplies. Attractive commissions. Alvin Company, Windsor, Conn.

## 77 TREASURE FINDERS

TREASURE Hunters! New 11-pound featherweight Model 101 locator for gold, silver and minerals. Money-back guarantee best available. Also Geiger Counters for uranium prospectors. Complete information free. The Goldak Company, 1540 W. Glenoaks Blvd., Glendale 1, Calif.

SELECTIVE metal and mineral detector. Revolutionary design. Distinguishes metals from black magnetic sands. Readily detects metals under salt water. Also Geiger Counters and Mineralights. Free literature. Gardiner Electronics Company, 2018 N. Dayton, Phoenix, Arizona.

TREASURE—M-Scope Geiger Counters—Mineral Locators. Why buy something inferior when you can buy the best at a lower price? Backed by years of experience. Fully guaranteed by factory. Detects minerals, metals, gold, silver, coins. Payment plan available. Proven superior performance. Free 16 page illustrated booklet. Fisher Research Lab., Inc., Palo Alto, Calif.

GOLD, Silver, Metal Detectors, Geiger Counters for Uranium, Mineralights. Sensational new fully guaranteed models. None Finer. Information Free. Detectron Co., 5631 Cahuenga Blvd., North Hollywood, California.

## 78 WATCH REPAIRING

"THE Modern Clock." All about clock repair. 502 pages. 173 illustrations. $4.95, postpaid. 10-day return privilege. North American, Dept. 22M, 2018 North Ave., Chicago 47, Illinois.

5 ELGIN, Waltham, Illinois, Hampden Gents' wristwatches needing minor repairs. $18.00. Write for prices. B. Lowe, Holland Bldg., St. Louis 1, Mo.

WATCHMAKERS Tools, Materials, Supplies. Repairs. Catalog. Gales, Box 1000, Chicago 90, Illinois.

HELPFUL Hints on Watch Repairing. Valuable book for watchmakers, students, hobbyists. Price 75c. Dean Company, Box 3218, Daytona Beach, Florida.

## 79 MISCELLANEOUS

RECEIVE mammoth mails, magazines, catalogs! Three months 25c, 2 years $1.00. Waddell's Directory, 341-D East 76th, New York 21.

MAKE, Sell Artificial Flowers, Corsages, Chenille Dolls, Jewelry, Starting kits. Fibre, Leaves, Shellcraft, Rhinestones, Sequins, Findings. Wholesale Catalog 10c. Profitkrafts, 4508T237 Lorain Ave., Cleveland 2, Ohio.

OUTDOOR Toilets, Cesspools, Septic Tanks cleaned, deodorized with amazing Paw Paw Odorless. Tried and proved effective by over 150,000 worldwide customers. Easy, safe, economical to use. Saves digging, pumping. Satisfaction guaranteed or money back. Postcard brings Free details. Burson Laboratories, Dept. E-59, Chicago 22, Illinois.

TEN Interesting o-gauge track layouts, for your Christmas Tree Platform. 25c. Schriver Co., P. O. Box 2482, Philadelphia 47, Pa.

LEATHERCRAFT. Everything needed by beginners, advanced hobbyists and professional leatherworkers. Largest stock of supplies in U. S. Moderate-priced tooling leathers, top quality calfskins, tools, supplies, kits. Send 10c for Big Catalog. J. C. Larson Co., 820 S. Tripp, Dept. 2755, Chicago 24, Illinois.

BASEBALL, Football, Hockey, Attendance upped. 100% or No Pay. H. H. Bradford, 1010 So. Main, Dayton 9, Ohio.

WORLD'S Finest Candy! Putman's famous Opera Creams. Rare combination: rich cream centers, bittersweet chocolate coated. Get acquainted special; trial 8 oz. box, $1.00, postpaid in U. S. Putman's, Cincinnati 10, Ohio.

YOUR Leather Jacket renovated expertly. Free circular. Berlew Mfg. Co., Dept. 7, Freeport, N. Y.

RECEIVE big mails, offers, samples, catalogs. Three months 25c. Mailorder Mart, Dept. A-12, Box 5067, Nashville 6, Tennessee.

LIVING Miniature Trees, Plants. Complete exact instructions plus growth chemicals, only 2.00. Worth thousands! Fascinating, profitable. Satisfaction guaranteed. Rev. Ealer, Box 37, New York 53, N. Y.

"120 DIFFERENT Ways To Increase Gasoline Mileage." Also Speeds, Mileages, American Foreign Cars. $1.00. Holloway Publications, Bijou, California.

CESSPOOL trouble? Use Peps-It. Rejuvenates fermentation action, saves pumping costs, deodorizes, reduces masses. Costs only $2.50. Safe, Sanitary. Free descriptive literature. Chemical Cesspool Cleaning Co., Boston 34, Mass.

$1.00 BRINGS you photo (c) King Snake Killing Vicious Rattler. XYZ Ranch, Box 5142, North Long Beach, Calif.

FREE catalog listing of hobby equipment (woodworking, photographic, etc.) for sale or swap. Send full details. Homecraft Exchange, 6028 Rosslyn, Indianapolis, Indiana.

BUY vitamins direct. Amazing savings. Catalog free. Matoska, White Bear Lake, Minn.

LIFETIME protections, have your valuable cards, photos sealed permanently in plastic, wallet size, 35c each, 4 for $1.00. John Wycoff, Box 68, Waverly, Tennessee.

ELECTRIC Dry Shaver. 4 shaving edges. 1 year written guarantee. $4.49 P.P. Ayr, Box 252, Berlin, New Jersey.

BURGLAR protection. Protect your family with hotel type safety door chain. Install in 5 minutes. Only $1.00 postpaid. Satisfaction guaranteed or money back. Safety Chain, PO Box 5684, Dallas, Texas.

## 80 PERSONAL

POWERFUL mental telepathy, practical. Joe Johnson, Route 2, Lewisburg, Tenn.

MEXICAN legal matters. A. Espejo, Box 234, Hermosillo, Sonora, Mexico.

HAPPINESS. Romance. Contentment. Interesting, confidential information sent Free to single persons. Write today. Strone, 2488-PS Concourse, New York 58.

DETECTIVE'S Opportunities. Detective particulars free. Write, Wagoner, P-125 West 86th, New York 24.

PSORIASIS Victims: Hopeless? New Discovery! Free Trial offer. Write Pixacol, Box 7097-S, Cleveland, Ohio.

MEXICAN Legal Practice Reliably Conducted. Box 1736, El Paso, Texas.

"HOW Can I Find Out?" You Can! Information confidentially developed. Any matter, person, problem. World-wide. Officially licensed. Established 1922. William Herman, 170 Broadway, New York.

LETTERS Remailed from Hollywood 25c. Artcraft (S-3), 438 S. Wall St., Los Angeles, California.

BORROW by mail. Loans $50 to $600 to employed men and women. Easy, quick. Completely confidential. No endorsers. Repay in convenient monthly payments. Details free in plain envelope. Give occupation. State Finance Co., 323 Securities Bldg., Dept. U-14, Omaha 2, Nebraska.

"D-FOG" Prevents fogging, steaming eye glasses. Avoid embarrassment, accidents. Guaranteed. Years supply 50c. D-Fog, Box 205, Gene Autry, Oklahoma.

LETTERS remailed from home town of grand ole opry. 25c each. C. U. Rainey, 1915 Cephas Ave., Nashville 8, Tenn.

LET'S Trade Ties. Send yours with $1.00. Receive others. Ernest Winings, Box 886-A, Trenton, New Jersey.

DIE? Suffer? Ridiculous! Unique, thrilling book presents latest wonder drugs, miracle cures, lifesaving knowledge! Free Literature! Bijou, Box V8-1727, Hollywood 28, Calif.

INCREDIBLE! Unprecedented! Become mental superman overnight! Floor everybody! No studying! "Memoprop" does your thinking! It's uncanny! Revolutionary! Free Literature! Bijou, Box 1727-VZ, Hollywood 28, Calif.

JOIN National Guild Hypnotists. Details. Hypnodiscs etc. 10c. Guild, 48B Harlem, Dorchester 21, Massachusetts.

HAIR getting thin? Tormented by dandruff? Itch? Write: Viggiano, Pharmacist, 6556 Ladson, Pittsburgh 6, Penna.

SKINNY? Amazing bodyweight gains reported! Proven method. Confidential information. Cambria, Box 26-E, Cambria Heights 11, New York.

STOP forgetting birthdays, etc! Use guaranteed yearly reminder service! Send dates $1: "Forget-Me-Not", 9 Clifton Road, Natick, Massachusetts.

"OLD Indian Health Habits" May add 30 years to your life. $1.00. Satisfaction Guaranteed. Whig Carter, 516 Carlisle, Cincinnati 3, Ohio.

RECEIVE Mails, samples, catalogs, magazines, 10c. Star Directory, Odem, Tex.

LETTERS remailed or replies forwarded 25c each. Lenza, 3122B Arizona, Santa Monica 2, California.

NEED Gifts? Inexpensive. Samples 30c. Persil, 436 N. Y. Ave., Brooklyn 25, N. Y.

LETTERS Remailed 25c. Also private residence receiving address available. Monthly rates. Shanks, Box 3110-G, San Francisco 19, California.

PERSONAL Services By Proxy. Artcraft (S-4), 438 S. Wall St., Los Angeles, Calif.

INFORMATION for single people by Human Relations Consultant. Dr. B. Long, Box 375, Los Angeles 53, Calif.

CONFIDENTIAL information for single people, leading to happiness—romance. Write today! Karl Miles, Ph.D., Director, Personal Acquaintance Service, Inc., 601-G South Vermont, Los Angeles 5, Calif.

PILES! Tormented with the irritation and discomfort due to piles? Write for free important information. Mutual Products, Box 836-P, Cleveland 22, Ohio.

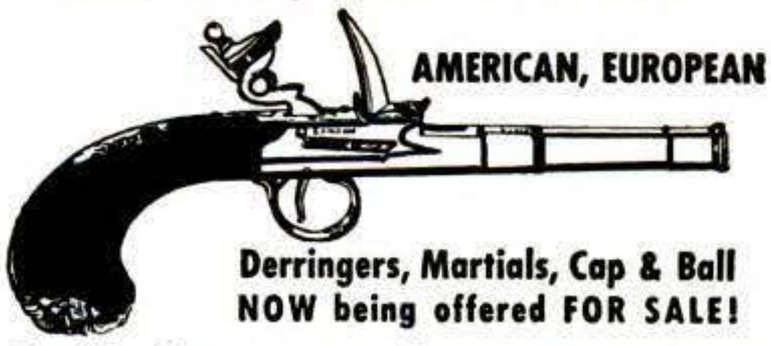
GETTING Bald? Benefit by my experience. Read "I'm Growing Back My Hair." $3.00. Box 784, University Branch, Coral Gables, Florida.

FREE Samples Gifts name listed 3 months 25c. Mailo, 3156 S. Black Court, Wichita 10, Kansas.



Copyrighted material

# ANTIQUE GUNS



**AMERICAN, EUROPEAN**

**Derringers, Martials, Cap & Ball NOW being offered FOR SALE!**

Send for finest, most complete PHOTOGRAPHICALLY ILLUSTRATED Catalog-Reference Book. Unusually different. All guns described, dated and priced. PLUS list of 1500 makers & Hall Marks. No gun lover should be without this BIG catalog. Only $1 — (refunded with first order.)

*the Museum of Historical Arms*

DEPT. D, 945 Lincoln Road Miami Beach, Fla.

---

## GET YOUR Dandy LATTICE BACK REST

The perfect Christmas gift for all your friends. No backaches, eliminates tension. Get this new Dandy Lattice Back Rest, made of finest material. Send name and address for C.O.D. delivery. Or send $3.95 and get your Back Rest sent prepaid. Satisfaction guaranteed or money back.

**VEALE MFG. CO. — COLUMBUS, IND.**

---

MAKE MONEY SELLING ESHELMAN CAR SNOW PLOWS & PLOWING SNOW FROM ROADS & DRIVEWAYS

## CAR SNOW PLOW

**CLEARS ROADS & DRIVEWAYS**

Fits any car, jeep, truck. Attached in 2 minutes. Clears snow 24" deep and full width of car. Light weight, sturdy. Order by mail. Or send for folder.

Eshelman Co., Dept. S-512
119 Light St., Balto. 2, Md.

---

## REAL LEATHER *NAVY* HELMET

***NO HOOKS, TUBES OR HOLES***

Brand new NAVY helmet of rich Cordovan Brown leather lined with soft warm fleece. Detachable chin strap. Ideal for flyers, cyclists, farmers, hunters. Children love them! Cost Gov't. $10.00. Small, medium, large sizes. Send cash, chk., 25% dep. plus postage on COD. Money back guarantee..... **$2.00 pp.**

**GRAND-HAWTHORNE SURPLUS**
1439 S.E. Grand, Dept. PS-12-52, Portland, Ore.

---

*Made stronger to last longer*

## E&J FOLDING WHEEL CHAIRS

- Easy handling
- Comfortable
- All welded joints
- Chrome plated
- Accessories and modifications available

*See your dealer or write for catalog*

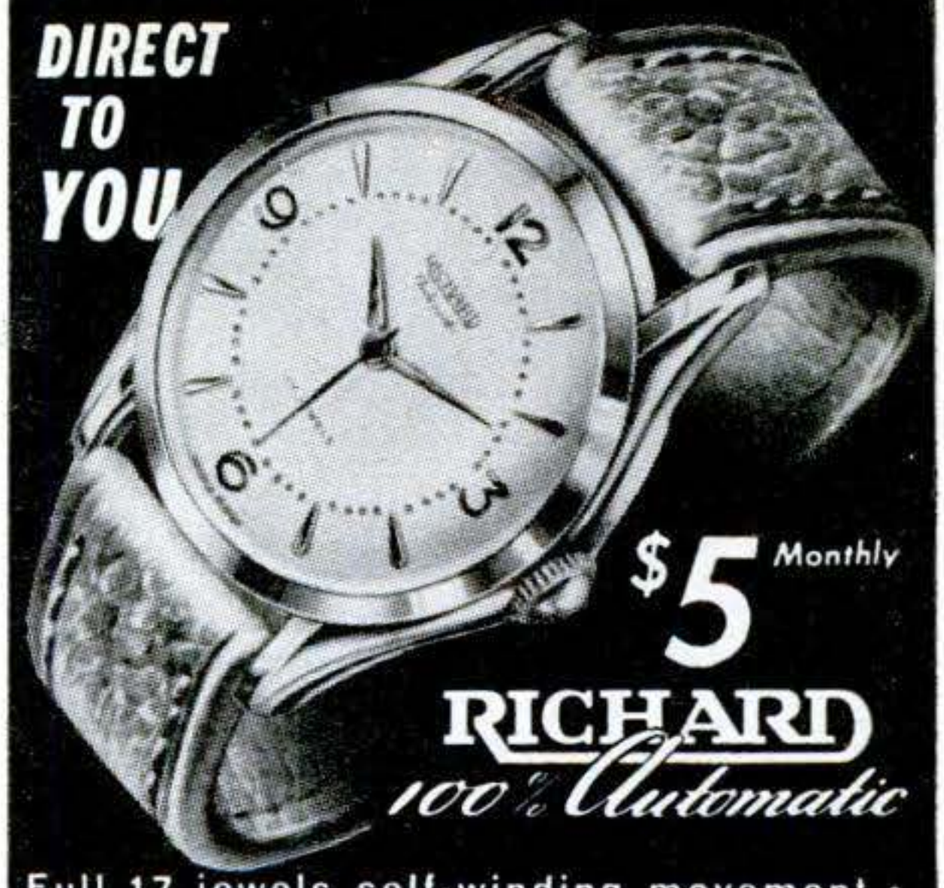
FOLDS TO 10 INCHES

**EVEREST & JENNINGS**
761 No. Highland Ave., Los Angeles 38, Calif.

---

## SWITZERLAND's BEST

***DIRECT TO YOU***



**$5 Monthly**

**RICHARD** *100% Automatic*

Full 17 jewels self-winding movement • water- and shock-resistant • antimagnetic • luminous dial with raised numerals

SO PERFECT...
SO HANDSOME...
that nothing can do it justice but a

**10-DAY FREE TRIAL**

**Richard Watch, Inc., Long Branch, N. J.**
Send me, for 10-day free trial, 1 RICHARD-Automatic, 14 Karat Rolled Gold Plate, stainless steel back, $60 cash or 13 X $5. (Incl. Fed. Tax and leather band)

Signature:.....

Please paste this coupon on a postcard with your name, address and employer's name and address.

SEND NO MONEY

P122

LIFETIME OF AUTOMATIC PRECISION

---

## a QUICK-SET® tripod

**every photo fan's idea of the perfect Christmas gift**

A Quick-Set Tripod assures "professional" movie and still results: wide-angle pan head action pans 360°, tilts 150° from straight down; speedy, easy elevation and wide-sweep crank control; safety balanced legs. Give a Quick-Set for solid Christmas pleasure!

**Quick-Set Tripods for every use and camera . . .$14.95 to $53.50.**

**QUICK-SET, INC.**
1326 N. Elston Ave., Chicago 22, Ill.
**Dept. PSC 12**

Please rush me a FREE copy of the famous QUICK-SET Tripod catalog.

Name_____

Address_____

City_____ Zone____ State_____

My Photo Dealer is_____



Copyrighted material

## Choice of Champions

Beyond doubt, Northlands will make you a better skier — give you confidence — add to your enjoyment. Follow the lead of the world's leading skiers. Ask for, and get, Northlands. Ski the professional way. Send for Northland's illustrated ski manual. Free in U.S.A.

**NORTHLAND SKI MFG. COMPANY**
**94 NORTHLAND PARK • NO. ST. PAUL 9, MINN.**

---

## BENJAMIN SUPER $CO_2$ GAS PISTOL

**NEW! Different**

**SAFE • NON-TOXIC • HI-POWER**
**ACCURATE • ECONOMICAL**
**CONVENIENT • PRACTICAL**

Easy to operate—Uses low cost Soda Cartridges. Shoots Cal. .177 Benjamin H-C Pellets & Darts or BB. **$15.00**
**Write Today for Illustrated Folder of All Models Benjamin Air Rifles and Benjamin Air Pistols.**
**Benjamin Air Rifle Co., 852 Marion St., St. Louis 4, Mo., U.S.A.**

---

## Mustang LIGHTWEIGHT

**$370.00** (Fed. tax paid, at factory)

9.5 hp. 4-cycle. 3-speed. Foot-shift. Over 70 miles per gal. Over 60 m.p.h. Write for free circular.

**MUSTANG, Dept. PS**
**635 W. Colorado, Glendale 4, Calif.**

---

*The Smoke Curls Up The Chimney!*

## Miniature Barbecue Fireplace ASHTRAY

Shown in LIFE, TIME, NEW YORKER

It's novel, different, attractive, useful—and a real conversation piece for home or office! Built, colored, textured to look like actual field-stone outdoor barbecue fireplace. The smoke curls up the chimney with remarkably realistic effect. Holds generous supply of cigarettes and matches. Metal fireplace grill lifts out for easy cleaning. Also makes an unusual planter or incense burner. *An ideal gift!* Order today.

**SEND NO MONEY**—just mail order. Pay postman only $1.98 plus postage and C.O.D. charges—or send $1.98 and we pay postage. Money back if not delighted. Mail order NOW.

**LEWIS PRODUCTS, Dept. 512**
**173 W. Madison St. Chicago 2, Ill.**

---

## THE WORST WRONG TURNS OCCUR AT DEAD-ENDS

● Driving the exact opposite of the right direction usually starts at a dead-end turn. You CAN'T make this common error with a HULL AUTO COMPASS. Write for local dealer's name, free literature.

**HULL MFG. CO.** P.O. Box 246-E-12, Warren, Ohio

Beaconlite® ILLUMINATED $6.95
STREAMLINE® $4.95
STANDARD [not illus.]

---

## 30 x 40 PROJECTION SCREEN $6.89

Customers examining the screen in our store ask disbelievingly: 'Is it really beaded? Does the low price include tripod *and* screen?' But after learning *what* they get, they admit that they expected to pay 100% to 150% more! Yes, you pay far below wholesale price for a first rate screen, equally suited for movie (8mm or 16mm) and slide projection. Crystal-beaded pyroxilin surface actually adds brilliance to your films and slides, makes them seem to come to life! Screen raises and lowers on elevating rod, metal can has beautiful scratchproof finish, carrying handle sets for balanced carrying, sturdy, plated tripod has protective rubber tips. *Thousands of our screens are in use by churches, clubs, colleges and amateurs.*

**OTHER SIZE BEADED TRIPOD SCREENS** 40x40" ....$8.19 37x50" ....$9.64 50x50" ...$11.89 52x70" ...$24.95

*Prepay in full or send $4.00 deposit with C.O.D. orders. Shipment is made Railway Express, shipping costs collect (or you prepay for 11 lbs. Parcel Post and insurance for 30x40, 40x40 screens).*

**SPIRATONE, 49 West 27th St., Dept. PS, New York, N. Y.**

---

## *Malayan THROWING DAGGER*

**BALANCED TO STICK!** **$1.98** postpaid

The MALAYAN FIGHTING KNIFE is used for self-defense, killing game, target skill. Powerful, silent, accurate weapon. Splits 1" board at 30 ft.

*EASY TO THROW!*

MONEY BACK GUARANTEE

*Fun, Thrills, Excitement!* Indoors—outdoors. Learn this Sport! Easy to throw accurately with our clear instructions. Beautiful, heavy-duty 10" knife. Tempered steel. Tough, rawhide-bound handle. Rare souvenir, unusual bargain. Limited quantity. At dealers or send $1.98

**WHOLESALE IMPORT CO.** Dept. B, 604 Marengo, Alhambra, Calif.

---

## 60 POWER TELESCOPE $3.95

**VARIABLE EYEPIECE 20 x 40 x 60—BRASS BOUND**

**NEW!** Three telescopes in one. 3 different magnifications. 20 power for ultra-bright images with 40 and 60 power for extra long range. Guaranteed to bring distant objects, people, sports events, ships, moon, stars, etc. 60 times as close. Most powerful for anywhere near the money. 5 Sections. Closes to 1 ft. long. Contains 4 ground and polished lenses. Also used as a powerful compound microscope. Directions included. Mass production enables us to offer this instrument at amazing price of $3.95. Nothing Else to Buy. We pay postage. Get yours now.

**CRITERION CO.** **331 Church St.**
**Dept. PSB-7** **Hartford 3, Conn.**

---

## ELECTRICITY *Anywhere*

**FOR PORTABLE, EMERGENCY OR HOME USE**

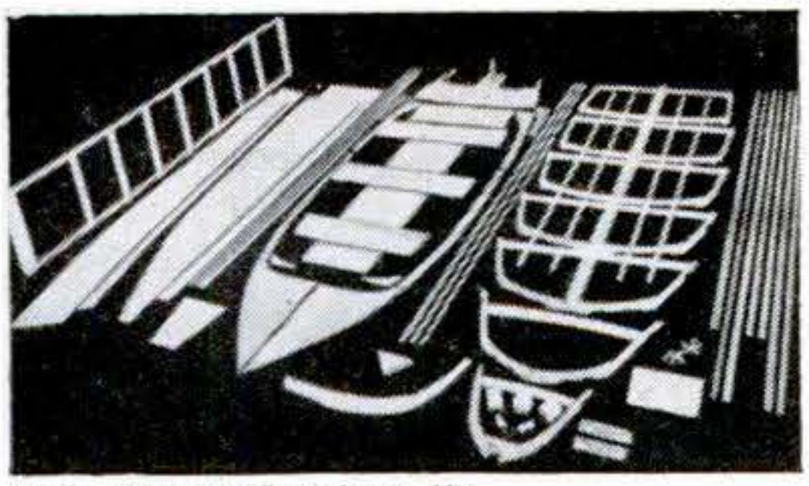
**ONAN** Electric Plants generate 110-volt, 60-cycle current for homes, farms, cabins and resorts beyond the highline. Lightweight, portable plants cut costs, speed work for contractors. Standby plants protect hospitals, homes, civil defense units against power failure. 400 to 55,000 watts. Gasoline or Diesel-powered. Priced from $219.00.

**WRITE FOR CATALOG**

**D. W. ONAN & SONS INC.**
**6746 UNIV. AVE., S. E., MINNEAPOLIS 14, MINNESOTA**



Copyrighted material



14-ft. DeLuxe Runabout Kit

# SAVE ½ or more! Buy a new CHRIS-CRAFT KIT

**for as little as $45 full price!**

**Many more new kit models! Send for FREE catalog today!**

8-ft. Pram Kit Boat—**$45**

10-ft. Pram Kit Boat—**$91**

**EASY** to assemble — fun, too! Precut Philippine Mahogany parts, Fir marine-plywood panels; brass fastenings; compound; decals; illustrated instructions. Also, new boat trailer—only $125 (tax extra). Mail coupon today! (Kit prices quoted f.o.b. factory, subject to change without notice.)

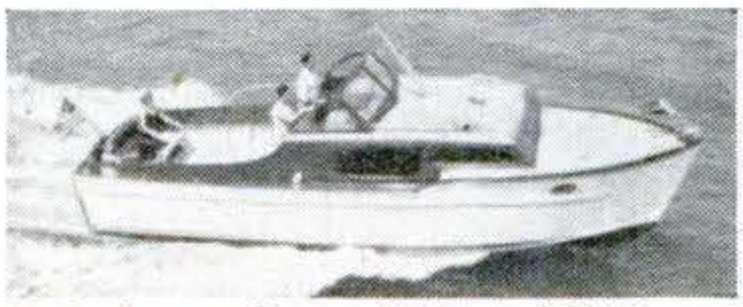
**Chris-Craft Corporation, Algonac, Mich.**

14-ft. Sportsman Kit Boat—**$139**

14-ft. DeLuxe Runabout Kit Boat—**$178**

17-ft. Kit Speedboat—**$449**

18-ft. Outboard Express Cruiser Kit Boat—**$595**



31-ft. Express Cruiser Kit Boat—**$2310**

**Chris-Craft Corporation, Algonac, Mich.** **FREE!**

Send FREE Chris-Craft Kit Catalog to:

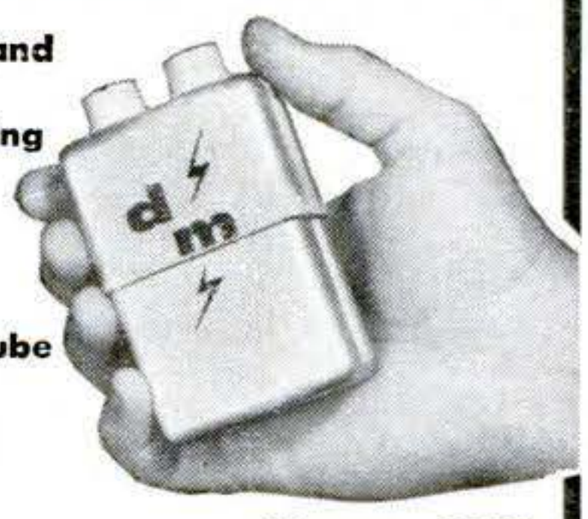
Name_____

Address_____

City_____ State_____

# DYNA-MITE POCKET RADIO

**POWERFUL! PERSONAL! PORTABLE!**



- Covers Full Broadcast Band 550-1600 K.C.
- Selective Dyna-Coil Tuning
- Batteries and All Parts Fit Within Case
- Hearing-Aid Battery Powered, Long Life
- Tiny Acorn Low Drain Tube
- Loud Clear Tone
- Over 1,000 Mile Range
- No Antenna Used for Local Reception
- No Ground Connections Ever Needed
- Picture Diagram for Radio Beginners

**$5.99** postpaid

"This neatly engineered little KIT was designed to give you a real personal portable radio that you can enjoy anywhere without disturbing others. Use it on camping trips, in bed, in your office or just anywhere. Remember this is not a weak crystal set, it is a POWERFUL VACUUM TUBE receiver that will give you good local and long distance reception. SET less batteries ONLY $5.99 postpaid! C.O.D. orders accepted with $1.00 deposit within United States and possessions. If you desire batteries, we can supply them at only $1.50 per set INCLUDING EXTRA "A" BATTERY or you may obtain them from your local hearing aid concern."

Alnico magnet receiver $1.25 only, when purchased with KIT. ALL PARTS GUARANTEED.

***Order Today at this Unbelievable Low Price!***

**PRECISION ELECTRONICS LABORATORY**

**DEPT. 1** **PLACERVILLE, CALIF.**

**SENSATIONAL**

# *New* IDEA!

**"WORK & WARNING"**

**NEW TWIN-LIGHT SET HAS VERSATILITY OF 20 FLASHLIGHTS!**

Two flashlights—20 uses! Double protection for road, home, farm, outdoors. Each with power of lantern, but more compact, easier to handle. Red or white steady or flashing WARNING light. Focusing 4-cell spot WORK light. The Ideal gift for any man—anytime!

Ask for the JUSTRITE 21-WW WORK & WARNING SET..... **$7.75**

FREE! Write for folder 21-M

**JUSTRITE** MANUFACTURING CO.

2061 N. Southport
Chicago 14, Illinois

Also Mfgrs. of the WORLD'S ONLY 8 CELL FLASHLIGHT!

*Yellow-Flash 8*

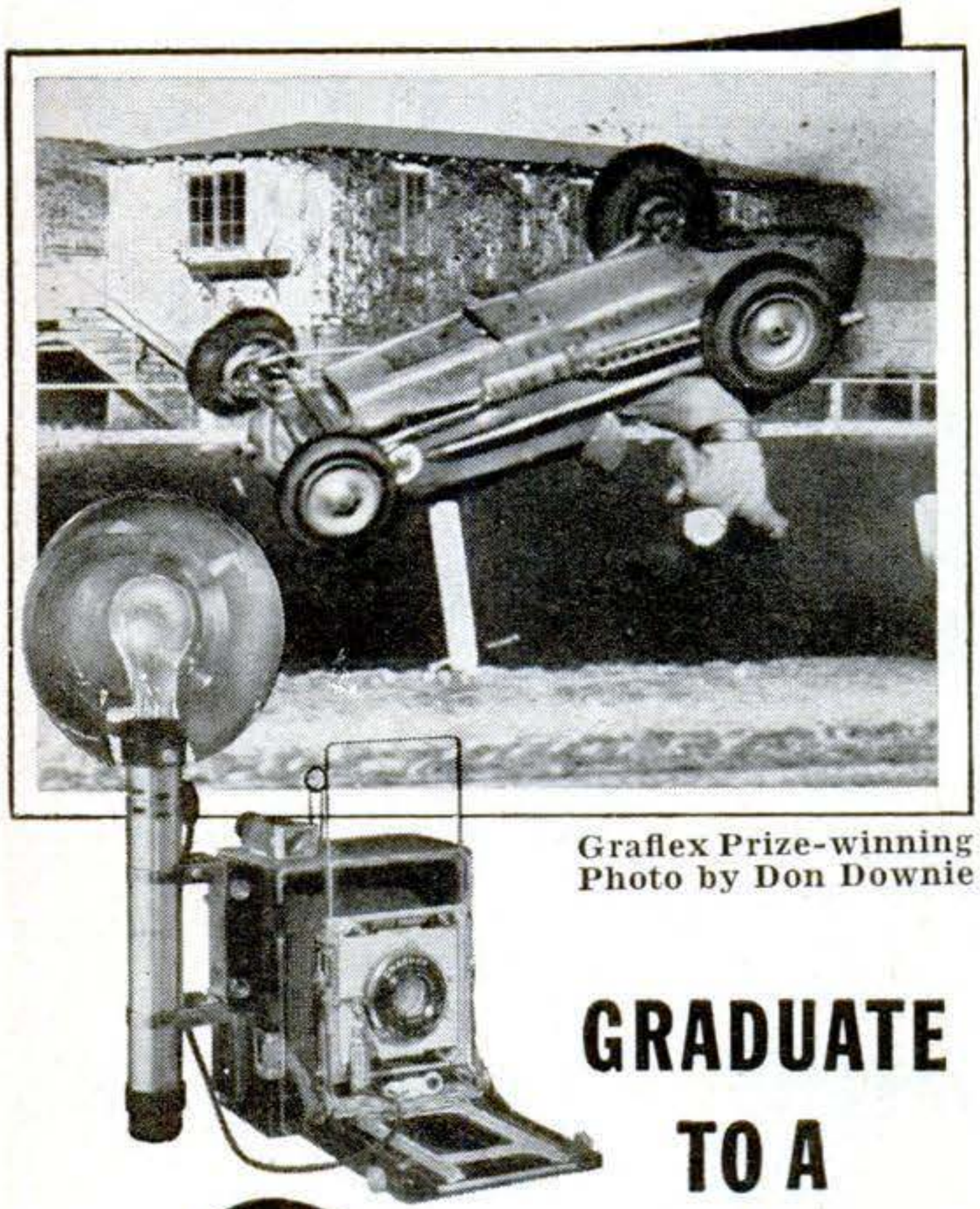
Uses 8 cells or 6-volt lantern battery. Compact, lightweight, adjustable.

Only **$3.95**



Copyrighted material

# GET OUT OF THE "SNAPSHOT CLASS"!



Graflex Prize-winning Photo by Don Downie

## GRADUATE TO A Graphic

## FOR SHOTS THAT "SIZZLE"!

● Nothing complicated about a Pacemaker Graphic. That's one of the reasons why it's first choice of press photographers who live by the lens. Another is its amazing versatility that enables it to handle everything from action to portraits. Examine both the Speed and Crown Graphics—each in three sizes. And see the popular Century Graphic too, now only $108 with f4.5 lens. Your Graflex dealer will show you how easy and economical your Graphic graduation can be. Many dealers offer budget terms as low as $2.00 weekly.

Graflex Inc., Dept. 173
Rochester 8, New York

Please send me the new FREE GRAFLEX 48-page booklet.

Name_____

Street_____

City_____

County or Zone_____ State_____

**GRAFLEX®**
*Prize-Winning Cameras*

---

SAVE 50% - THOUSANDS HAVE ASSEMBLED

## $42 UP PACKAGED BOAT KITS

World's most complete line . . . dinghies, skiffs, inboards, outboards, racers, cruisers. Assemble your own boat . . . it's easy, it's fun! See how they're built, how they perform.

**SEND 25¢ FOR NEW 1953 CATALOG**

**BOAT PLANS PATTERNS**

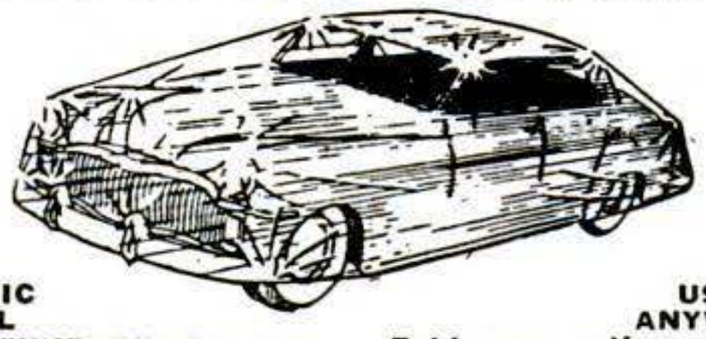
▶Over 50 modern plans and full size patterns. Racing classes, cruisers, inboards, outboards, sail boats. By famous designers. 6′ to 30′. DESIGN CATALOG 35c. Design Catalog and boat building handbook, $1.00

CUSTOM-CRAFT - DEPT. 7 - BUFFALO 7, N. Y.

---

## PORTABLE GARAGE

**$6.75**



PLASTIC VINYL — USE IT ANYWHERE!

● Goes wherever your car goes ● Folds compactly ● Keeps rain, snow, dust, salt air, sun or sleet away ● Protects your car's finish ● Durably constructed of vinyl plastic that is long wearing and tough ● Nylon threads for extra security ● Spring-tite, elasticized bottom, holds securely in all kinds of weather ● Fits all makes and models ● Direct from manufacturer ● Enclose check or money order for $6.75, or sent C.O.D.

*10-Day Money Back Guarantee*

**MARDO SALES CORP.**
480 LEXINGTON AVE., DEPT. G-1178 NEW YORK 17, N. Y.

---

NEW **Crosman for Christmas**

At dealers everywhere

Rifled barrel, .22 cal., high-powered air pistol for indoor-outdoor target shooting.

WRITE FOR CATALOG

CROSMAN ARMS CO., Dept. 46, Rochester 20, N. Y.

---

**"SURE SHOT GUN CASE TREATMENT"**

*A new proven chemical process that prevents*

***RUST ON GUNS***

It's radically different. The case is treated instead of the gun. This odorless chemical vaporizes slowly. The vapor seeks out and attaches itself as an invisible rust preventing film, to all metal gun parts, including the action and bore. **Protection is complete.** A $1.00 2 fl. oz. bottle treats one gun case for one year. **Money back guarantee.** At your dealer or direct from—

**BAYPORT CHEMICAL COMPANY, DEPT. 25**
**LINDEN HILLS STATION, MINNEAPOLIS 10, MINN.**

---

## LEFAX POCKET SIZE TECHNICAL DATA BOOKS $1. EACH

Printed on loose leaf, six hole, 6¾″ x 3¾″ bond paper, each book contains about 140 pages of technical data, presenting condensed, accurate and essential data for the student, engineer, technical worker and business man.

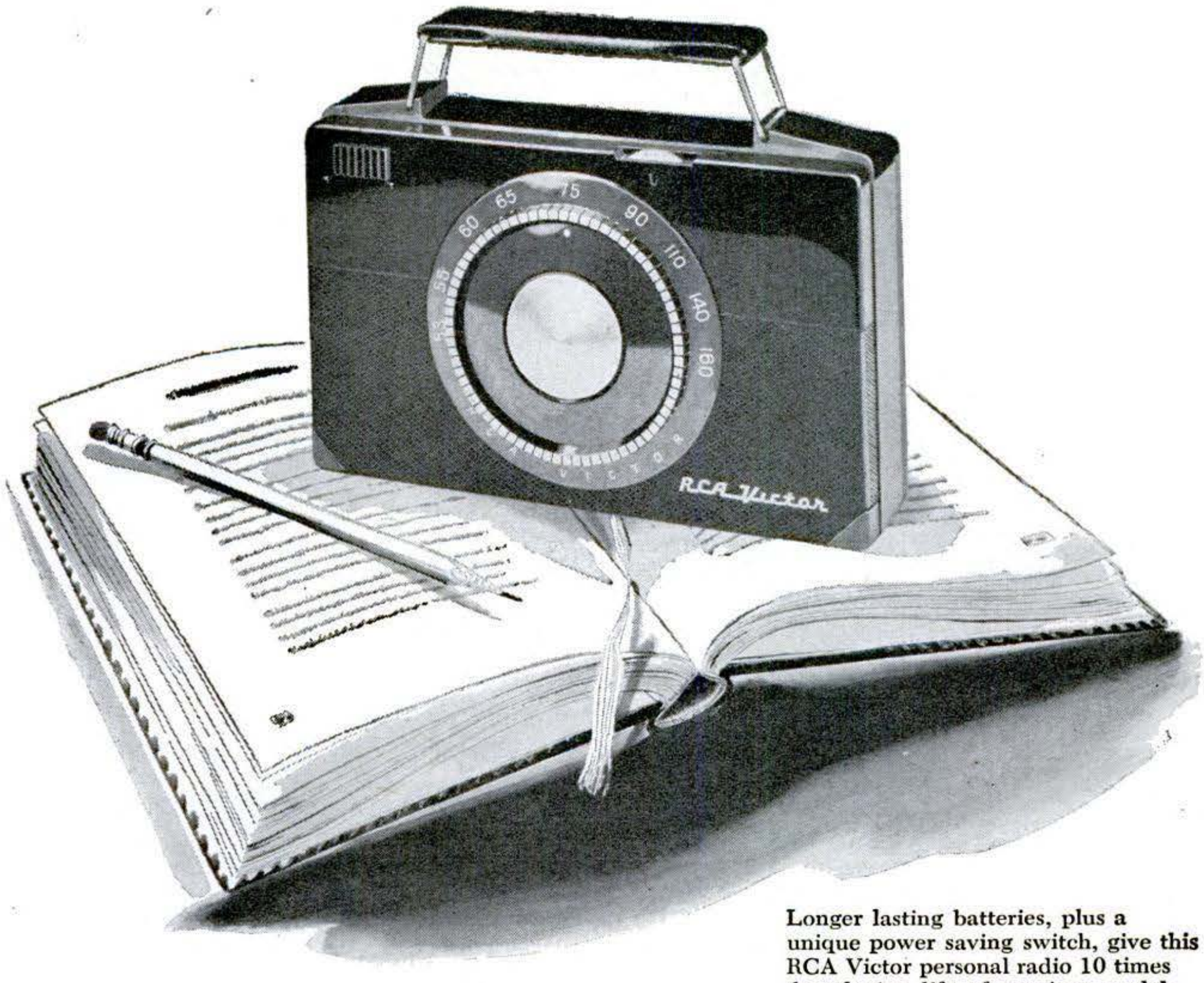
| | | |
|---|---|---|
| Architecture | Building Constr. | Piping Data |
| Home Heating | Radio | Surveying Tables |
| Illumination | Television & FM | Trig-Log Tables |
| Electrician's Data | Electricity, AC | Metallurgy |
| Builder's Data | Electricity, DC | Analytic Chem. |
| Lumber Data | AC Motors and Generators | Highway Eng. |
| Air Conditioning | Transformers, Relays, Meters | Mech. of Materials |
| General Math. | Hydraulics | Pwr. Trans. Mach. |
| Math Tables | Surveying | Thermodyn. Tbls. & Charts |
| Physics | Mech. Drawing | Phys. & Thermodyn. Data |
| Chemical Tables | Machine Design | Phys. & Org. Chem. |
| Metals | Machinists Data | |
| Gen. Chemistry | | |
| Reinf. Concrete | | |

Write for FREE catalogs (over 2000 listings). See for yourself how helpful LEFAX can be to you. Send $1 for each book, (or $5 for any six books listed above) to

**LEFAX DEPT. PS-10 PHILADELPHIA 7, PA.**



Copyrighted material




**Longer lasting batteries, plus a unique power saving switch, give this RCA Victor personal radio 10 times the playing life of previous models.**

# New Personal Radio...plays 10 times longer

Just about the size of the average book, this new Personal radio—developed through RCA research and engineering—offers new performance, convenience and economy to those who want a light, beautifully streamlined, long-lasting instrument.

Secret of its long life is a new dry cell "B" battery—used in combination with redesigned "A" batteries to create a more lasting power source. Additional life is given by a unique switch, for use in areas where reception is strong, which lets the batteries rest, and adds up to 30% to their lives. RCA Victor's new receiver plays *instantly*, without warm-up, has an automatic control to keep the sound volume even, and can be had in six rich colors.

**Development of this compact radio is another example of RCA research and engineering at work for *you*. RCA research means better quality and performance from any product or service of RCA and RCA Victor.**

* * *

*See the latest in radio, television and electronics at RCA Exhibition Hall, 36 West 49th Street, N.Y. Admission is free. Radio Corporation of America, RCA Building, Radio City, New York 20, N.Y.*

RCA®

***RADIO CORPORATION OF AMERICA***

***World leader in radio—first in television***



Copyrighted material

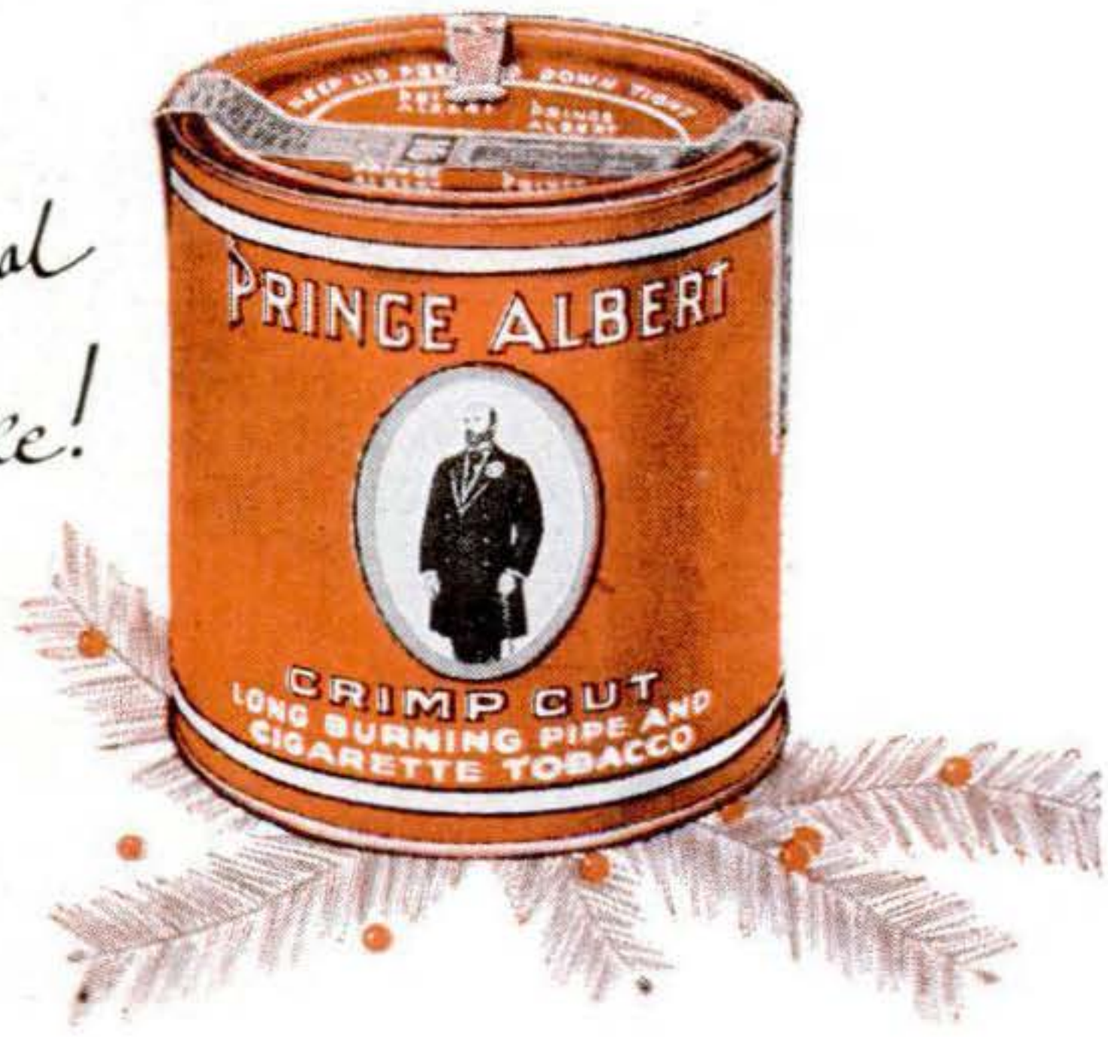
# Give him mild and tasty

# Prince Albert

**America's largest-selling smoking tobacco**

Give him a big one-pound tin of Prince Albert—choice, crimp cut tobacco! Prince Albert's gaily decorated gift package needs **no wrapping — you just** write your message **on the built-in card!** Give P. A. to your **friends who roll their** own cigarettes, **too!**

*The National Joy Smoke!*




R. J. Reynolds Tobacco Co., Winston-Salem, N. C.



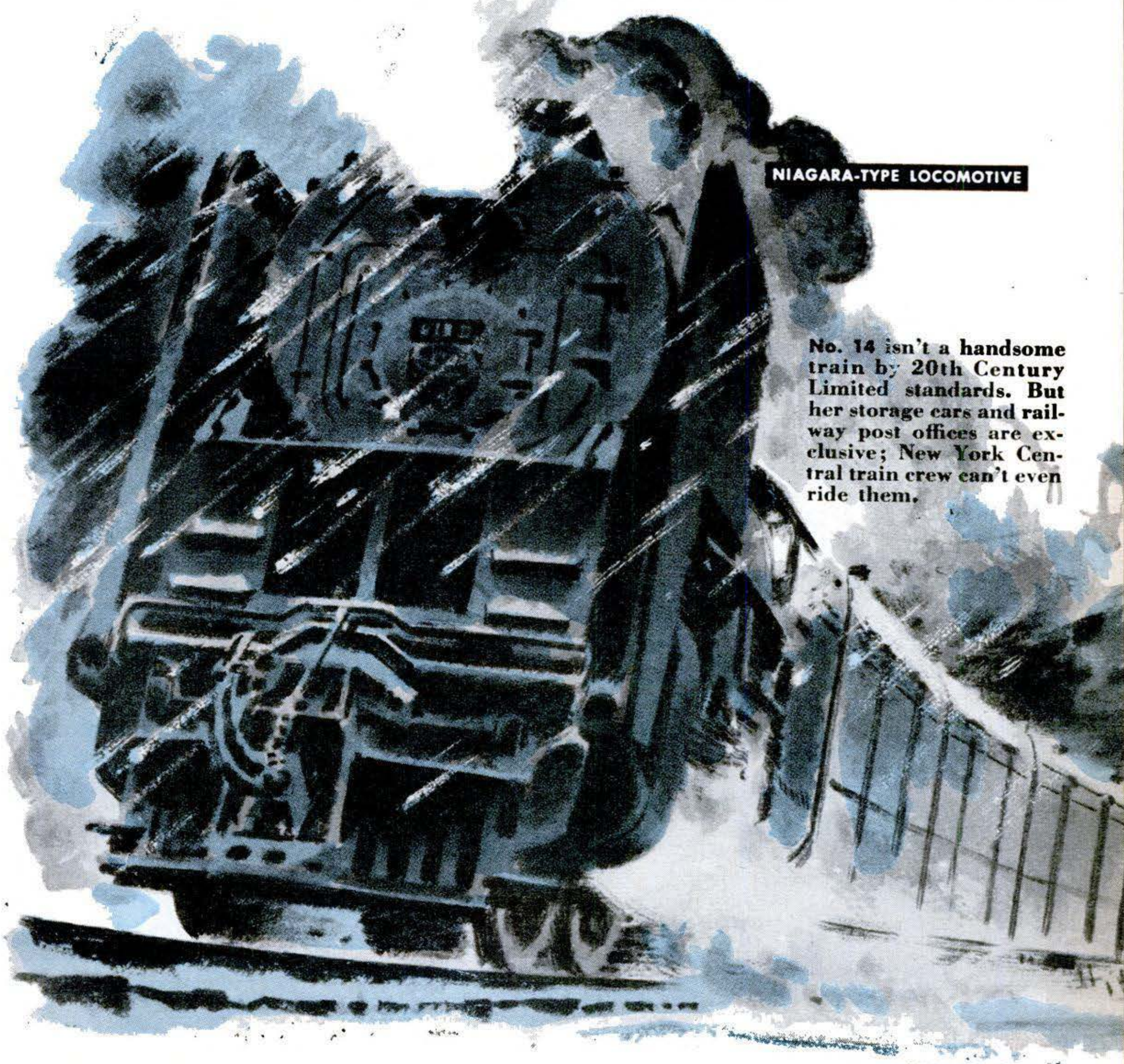
Copyrighted material

POPULAR SCIENCE
REG. U. S. PAT. OFF. Monthly

***Tightly guarded, unglamorous 80-mile-an-hour No. 14 makes sure that last-minute Christmas cards arrive on time.***

**By Henry B. Comstock**

THE little man with the big handful of Christmas cards looked worried. He was 20 feet from the letter box marked "Via 20th Century Limited" when a postal clerk dumped the last of a mountain of brightly colored mail into a can-




**No. 14 isn't a handsome train by 20th Century Limited standards. But her storage cars and railway post offices are exclusive; New York Central train crew can't even ride them.**



Copyrighted material

**"MUD," or unworked mail, is spread out on the pouch table. Special-delivery parcel post goes into the open-mouthed pouches; letter packages, to the pigeonhole crew.**

vas pouch and relocked the empty box.

"Hey, wait for these," yelled the latecomer. "If they don't make the Century . . ." His voice trailed off.

The clerk grinned and stuffed the cards into the bulging pouch. Then he turned to me, winked—and told me a little inside story that is a neat sample of the ingenuity which the Post Office devotes to speeding delivery not only of Christmas cards but of everyday mail.

"Fact is," he revealed, "this stuff isn't going east on the Century at all. In another half-hour it will be out of town on the hottest mail train in the United States. That's Number 14, due in New York at 6:30 a.m. tomorrow—three hours before the plush and varnish.

"If we marked this box 'New York Mail' nobody would stop to read it and half the letters going into it would be addressed to Omaha. But everybody knows the Century, where it runs and how fast it gets there. So they figure they are giving themselves a break every time they flip an eastbound letter in the slot. Which is okay with us, because they're right."

To learn more about Train No. 14, I went to see District Superintendent M. R. Clarke in the Chicago office of the Postal Transportation Service.

Copyrighted material

"That clerk wasn't fooling," Clarke said. "Number 14 is the heaviest and busiest of all the 7,666 mail trains in regular daily service in the country. Normally it takes a crew of 47 clerks to work her first-class mail and special-delivery parcel post. But right now, of course, we're doubling up on our regular crews, and using additional men. You want to make a run with them?"

### *No Day for "Flypaper"*

I most certainly did, and three days later I was streaking through a sleet storm aboard the hottest job on the "Chic"—railway Post Office slang for the New York-Chicago route.

"No day for flypaper," cracked a clerk, as he upended a heavy pouch, tumbling a couple of thousand letters onto a table.

"Flypaper," I judged, was air mail; these fellows talk their own lingo.

Before I could ask, a sharp reverse curve had every man on the train grabbing for the guard rails. But the car leveled off with a final lunge, and two seconds later they were all back at work, tossing the first-class stuff into the maze of pigeonholes on the walls.

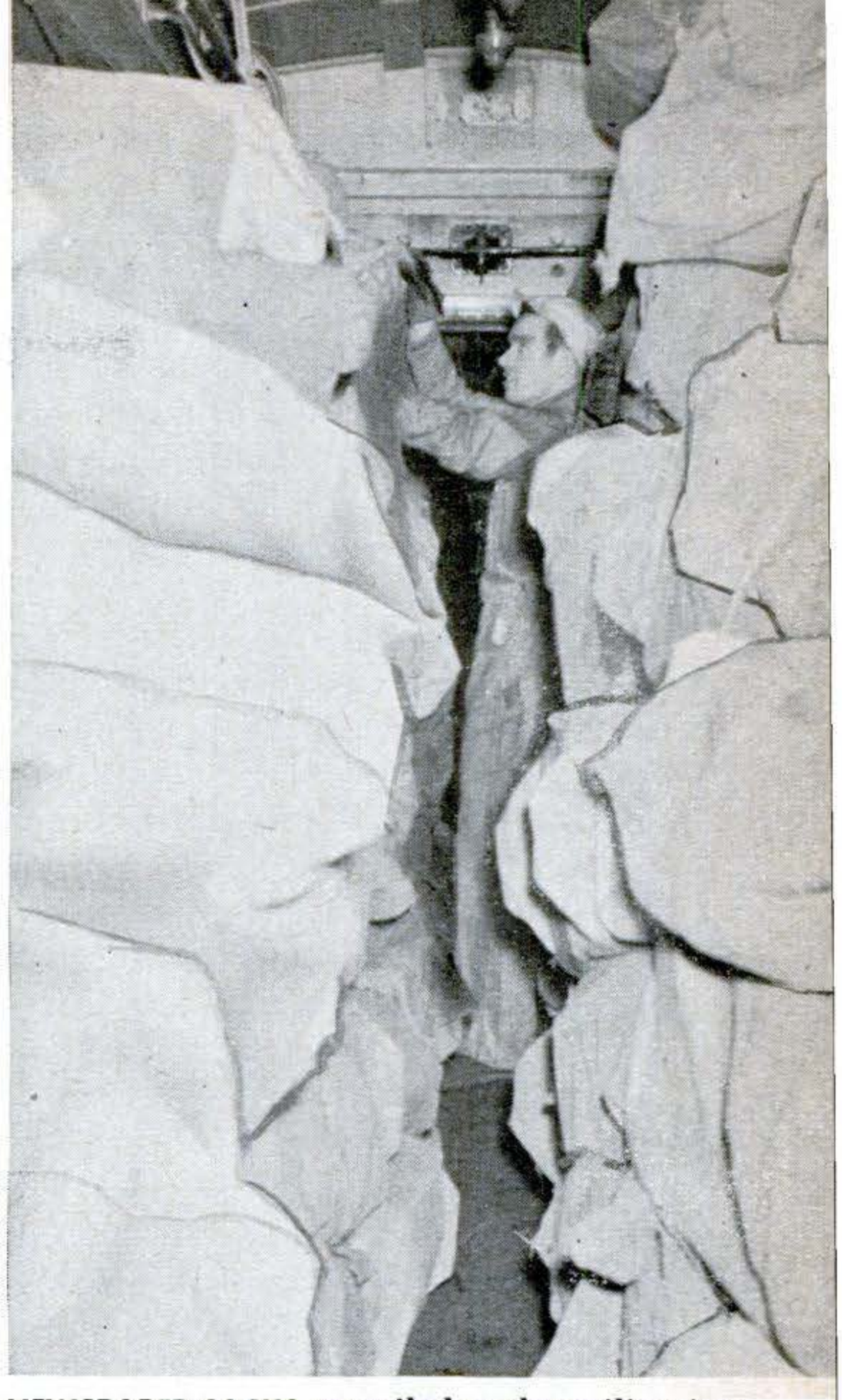
Back on my own two feet, I said: "Guess you don't think much of Christmas mail."

The dumper shrugged.

"It's good for overtime."

Halfway down the brightly lighted car a stocky young sub laid one hand on the short-barreled .38-caliber revolver which every Postal Transportation clerk carries, and rasped to nobody special:

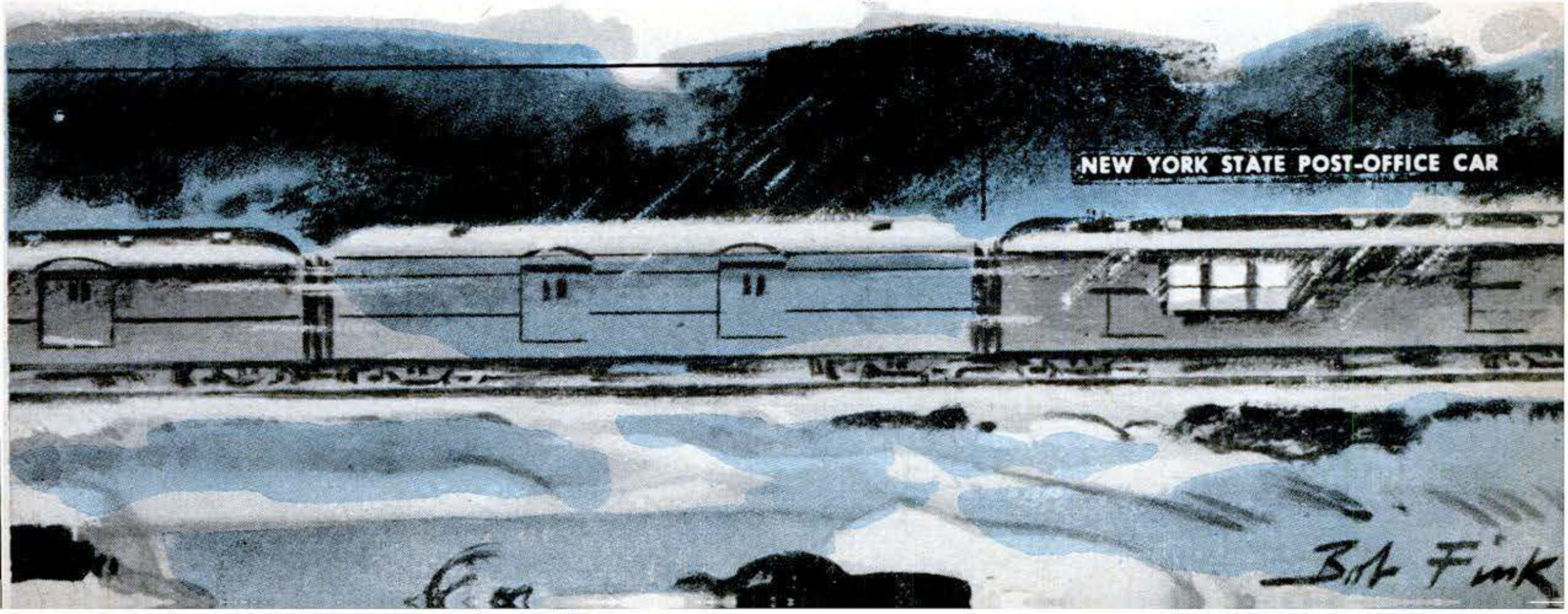
"All the same, I'd like to use this on the guy who dreamed up cards that measure over 4½ inches wide."



**NEWSPAPER SACKS are piled to the ceiling in a storage car. New Yorkers are always hungry for home-town news, and every daily paper west of Chicago contributes to No. 14's cargo.**

I saw what he meant. Already he had accumulated a heap of envelopes too large to fit the pigeonholes.

There was nothing handsome about No. 14, inside or out. I had been told



that she was the lineal descendant of the original "Fast Mail," established in 1875, to furnish 30-hour postal service between New York and Chicago. Perhaps you have seen lithographs of the original flier, a fabulous little train of four white postal cars, each trimmed with cream and gold, and bearing the embossed Great Seal of the United States on either flank, set off by handpainted landscapes.

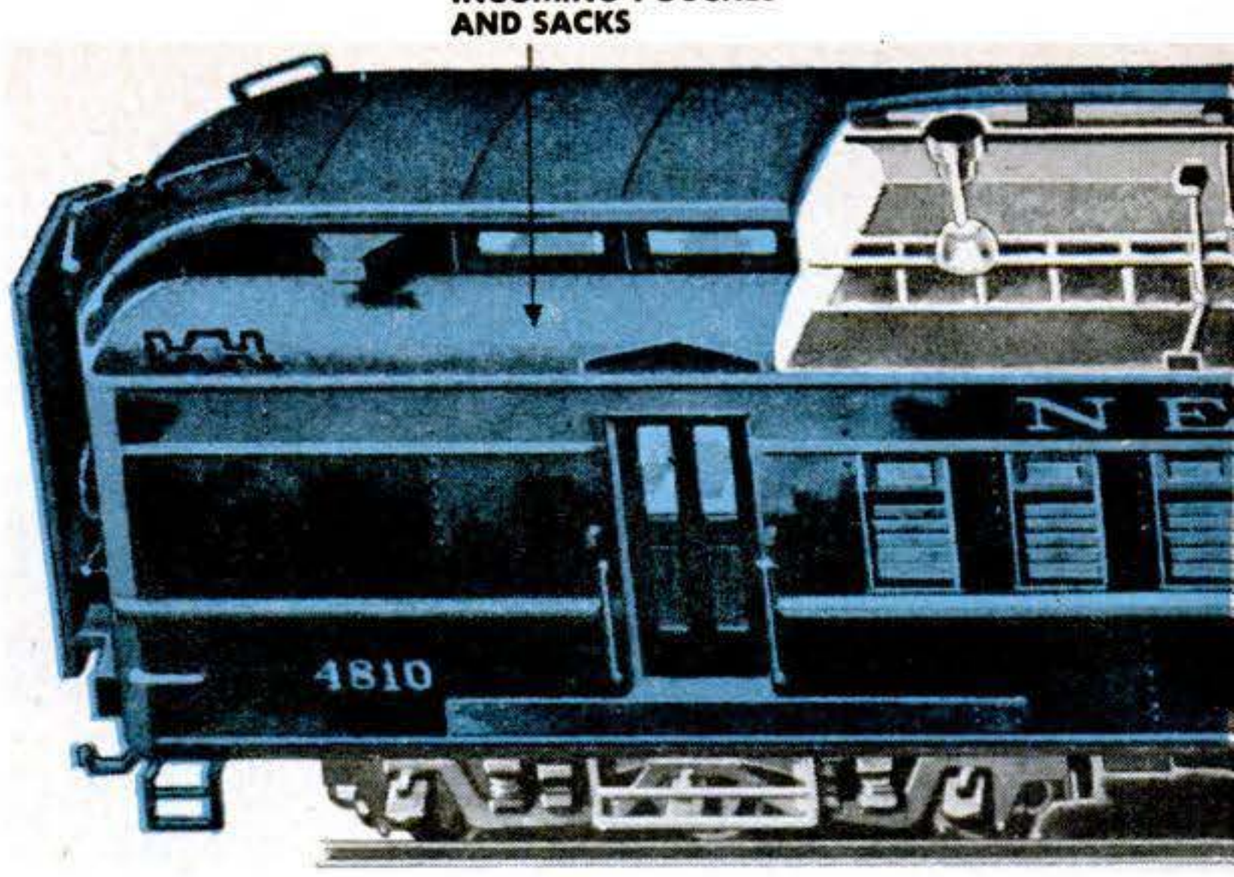
But No. 14 had the silhouette of a sawtooth file. A huge Niagara-type engine had been assigned to the head end; its 6,000 horsepower would be needed to smash an 80-mile-an-hour swath through the sleet. Behind the bulking tender were nine mail-storage jobs and three Railway Post Office cars. Crowning the string was an aging New York Central combine coach for the train crew.

### *Mail Funnels to Chicago*

Uncle Sam pays the New York Central 56 cents a mile for the use of these big 60-footers, which cost $70,000 per unit. The Central's job is to get them over the road, but how the Postal Transportation Service conducts its business aboard them is strictly its own affair.

The business had started at 7:00 in the morning, when a switcher eased the 13-car train onto Track 13. Out on the platform a fleet of trucks, groaning under the weight of thousands of "balloons," or heavily loaded letter pouches and paper sacks, was already standing by.

Practically none of this mail had originated in Chicago. It had come from



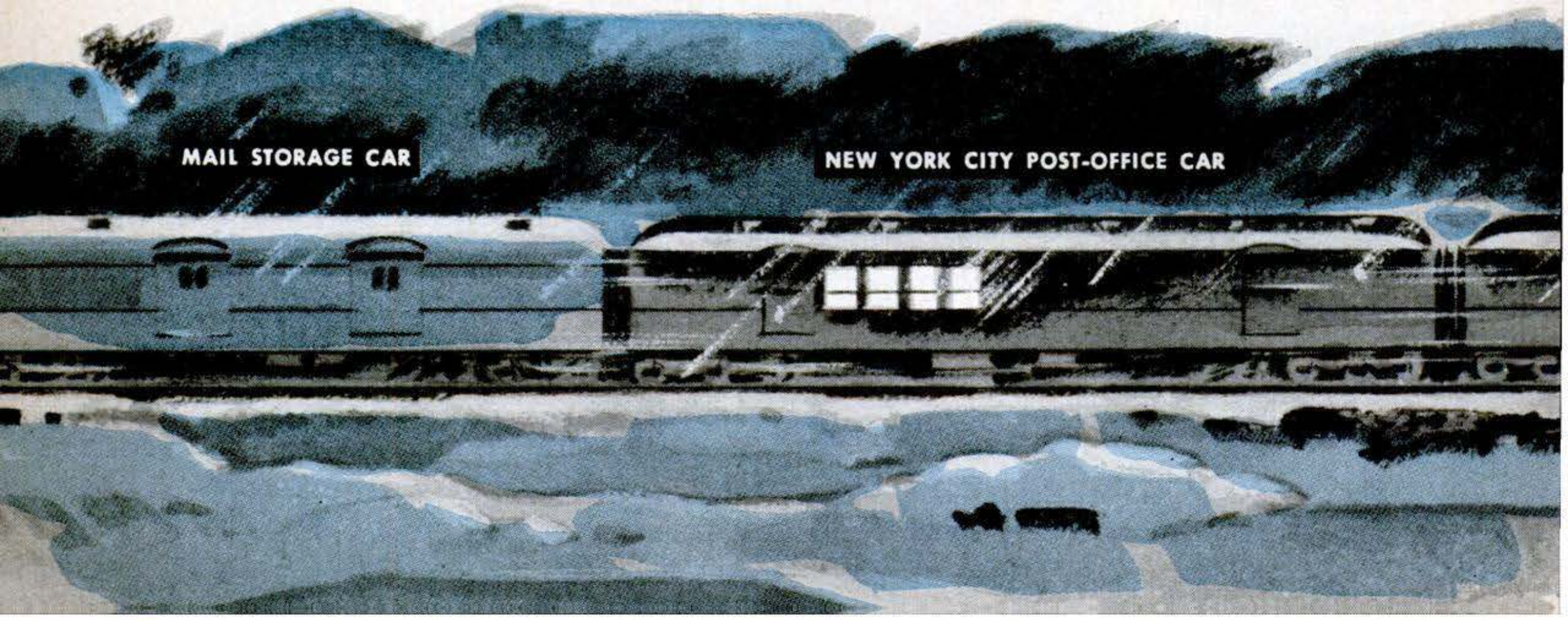

**Standardized design of RPO cars simplifies**

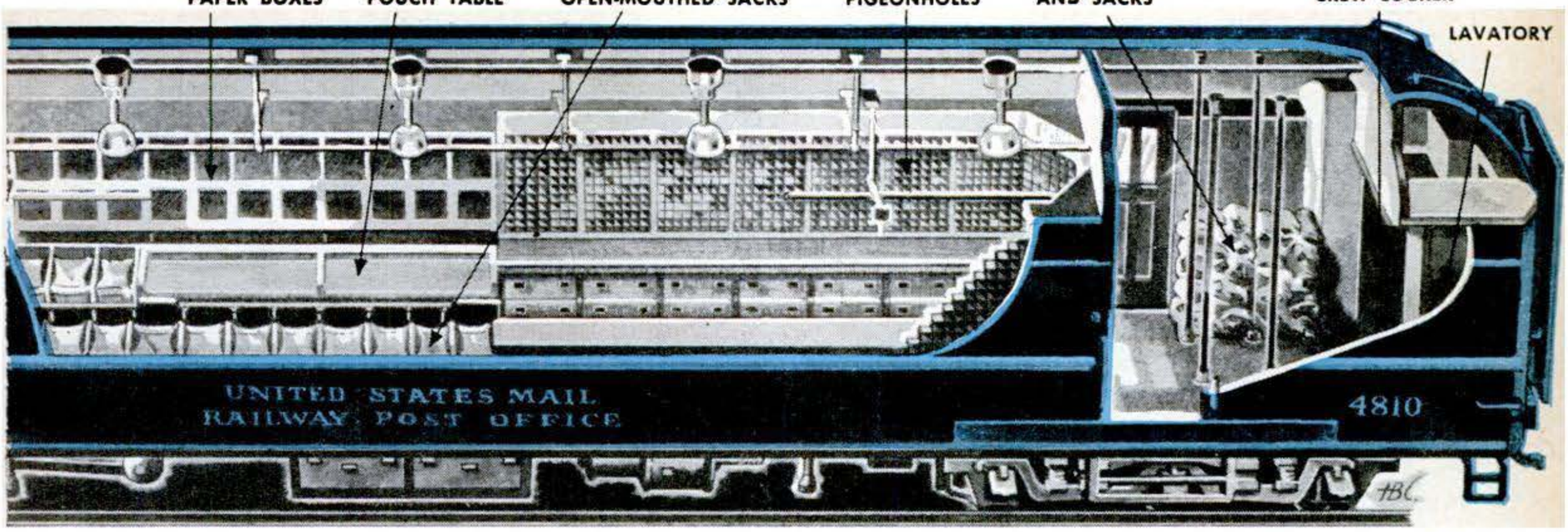
fast-mail connections extending in a great arc from New Orleans to San Francisco, Seattle and Duluth. Other RPO clerks had already labeled these mail bags.

Now it was up to the crew on No. 14 to break down the contents of the pouches and sacks into hundreds of subclassifications. The 57 clerks would be expected to handle more than 800 pouches and 400 paper sacks between Chicago and Cleveland, and before the train had made its unceremonious departure at 10:30 a.m., a good third of the job was in the bag, according to E. F. Lavis, acting foreman of the flier.

Lavis, who stands six feet four and bears a striking resemblance to Abe Lincoln, was responsible for filling out the innumerable forms which give the Service a complete work report at the end of each run, down to the last loose nickel found in the bottom of an incoming pouch.

"Had a funny experience with a 50-






**mail sorting. But each clerk has to know the locations of some 1,200 eastern post offices.**

cent piece years ago," he told me, as he placed a penny in a folding paper cup and carefully labeled it. "Because my hands were full of letters at the time, I stuffed the half-dollar in a pocket and never thought of it again until some time later. Then I dug out what I thought was the same 50-cent piece and gave it to the Clerk in Charge, for forwarding to the Cleveland Office. About a week later I got a red-hot letter from the big boss. He told me that the next time I turned in half a buck it had better be the exact one I had found. I figure the original coin had been planted as a test."

### *Deft Fingers Work Like Machine*

In addition to his paper work, Lavis was "working a case," just like any other clerk.

"You might say this is the backbone of our operation," he said. "As you've already seen, these three RPO cars are laid out almost exactly alike.

"It's the business of the pouch clerk down at that table to sort the stuff which the dumper spills out. He shoots the special-delivery parcel post into the right open pouches, and distributes the packages of letters among the clerks at this end of the car. We break open the packages and work the letters into the right pigeonholes. Then, when one of them is full—that takes about 50 letters—we empty it and tie the contents up like this."

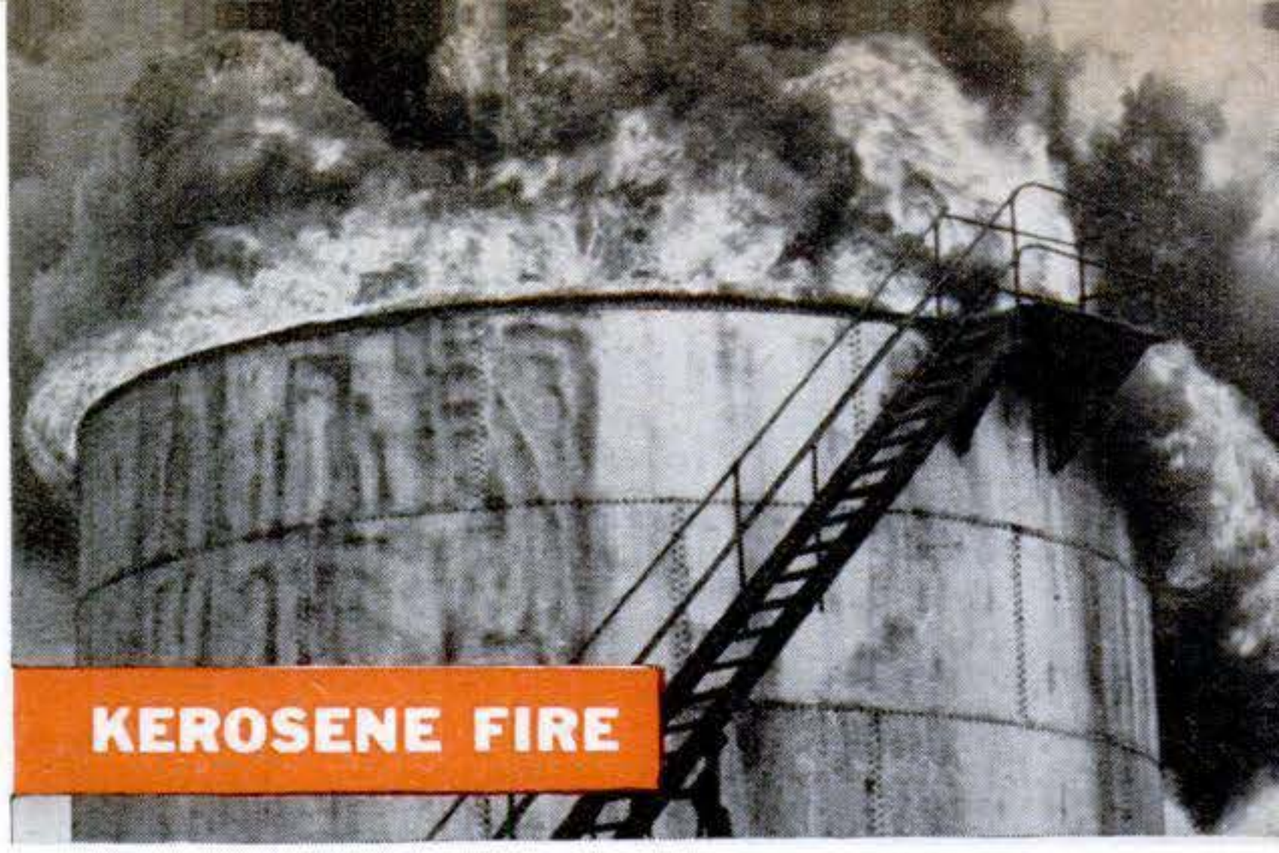
As he spoke he dug his fingers into one of the small compartments and slipped out an assortment of plain and fancy envelopes. Working with the speed of a mechanical binder, he whirled a length of jute around them twice in each direction, then tied a double hitch with a release loop. A final snap of the twine and he had another "tie-out" package ready for a receiving pouch.

To hear Lavis tell it, this mail-classifying job was as simple as the "Travel for Uncle Sam" advertisements. But he had left out one important detail. That

[Continued on page 274]

Copyrighted material

# Air Douses Oil Fire

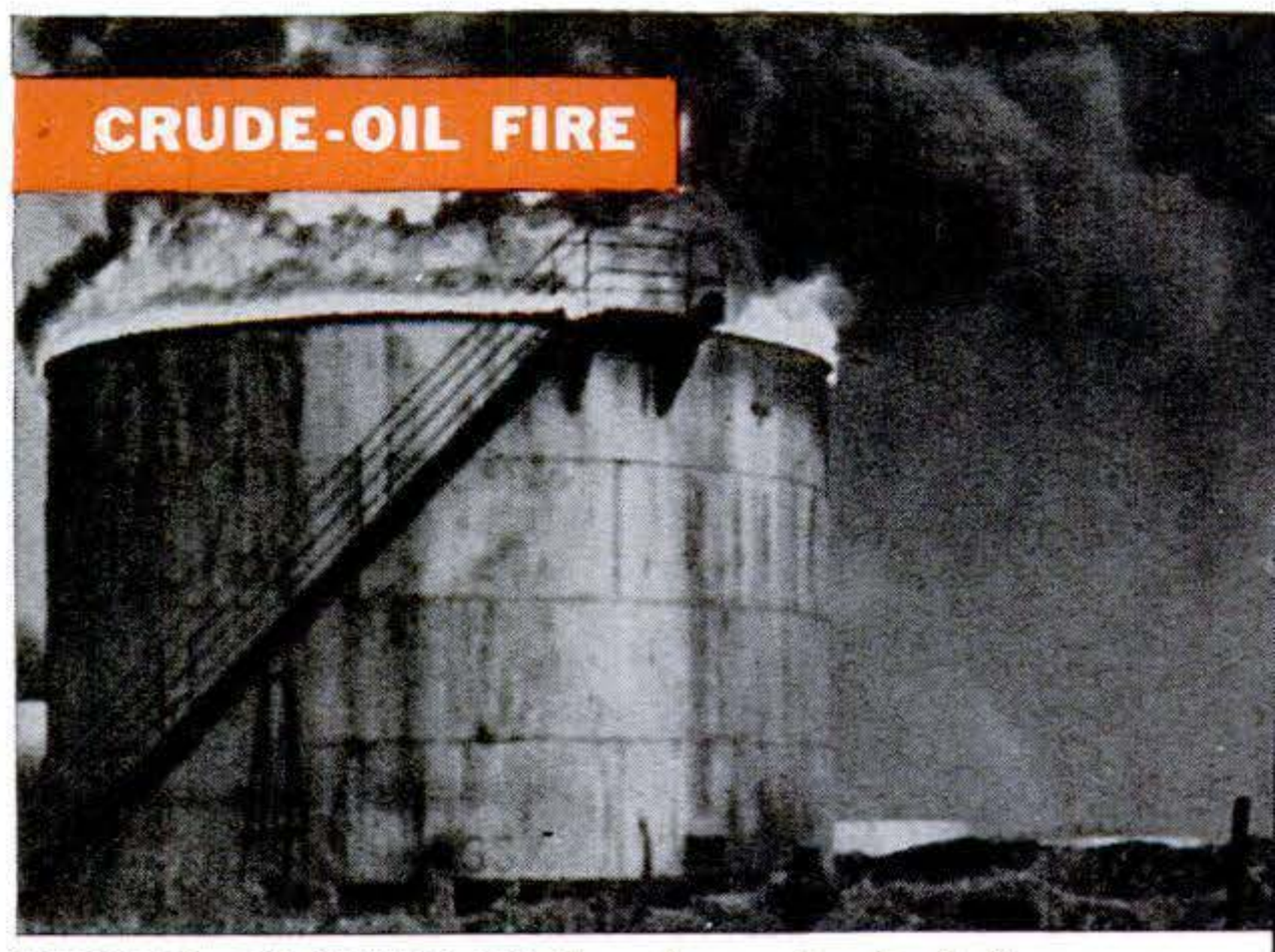



**HUNDRED-THOUSAND-GALLON TANK of kerosene is set ablaze to test fire-fighting with air.**

INSTEAD of fanning flames, air quells them in a new way to put out fires in oil tanks.

It consists of injecting air under slight (six-pound) pressure at the bottom of a tank of burning oil through a pipe entering at the center. Rising air bubbles stir up the tank's contents and bring cooler oil to the burning surface. This cooling effect prevents the heat of the flames from generating the combustible oil vapor they feed on.

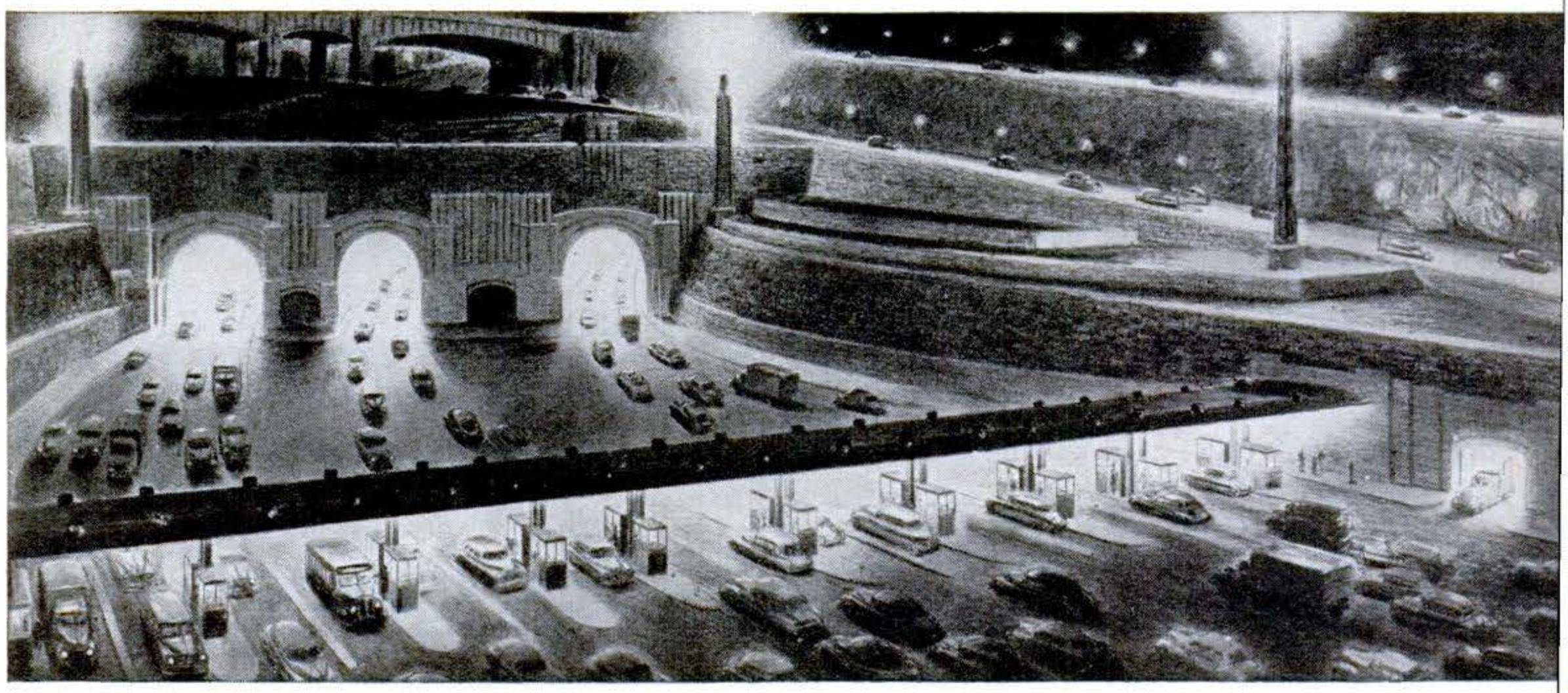
In five seconds, air injection put out a kerosene-tank fire in a test at the Olean, N. Y., refinery of Socony Vacuum Oil Co. Within 45 seconds it reduced the flames of a crude-oil fire to 12-inch height, killing their intense heat. Then the hot metal of the tank could be cooled with water, permitting firemen to climb to the tank's rim and finish the job in five seconds with fire-extinguishing foam.




**TANKFUL OF CRUDE OIL has been ignited for tryout of same fire-extinguishing method.**

# Tunnelers Plan Six-Lane Highway

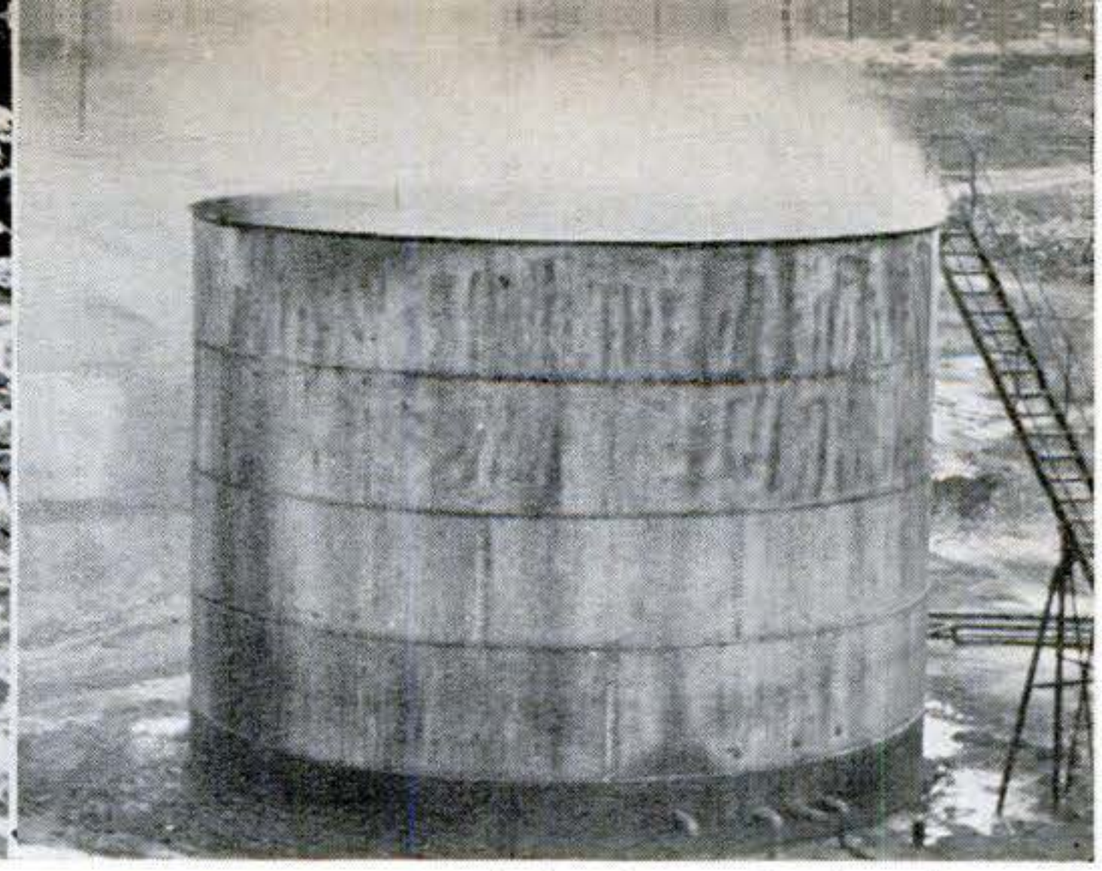
A NEW automobile tunnel beneath the Hudson River will add a third tube to the twin-tube Lincoln Tunnel to relieve congestion at one of New York City's busiest



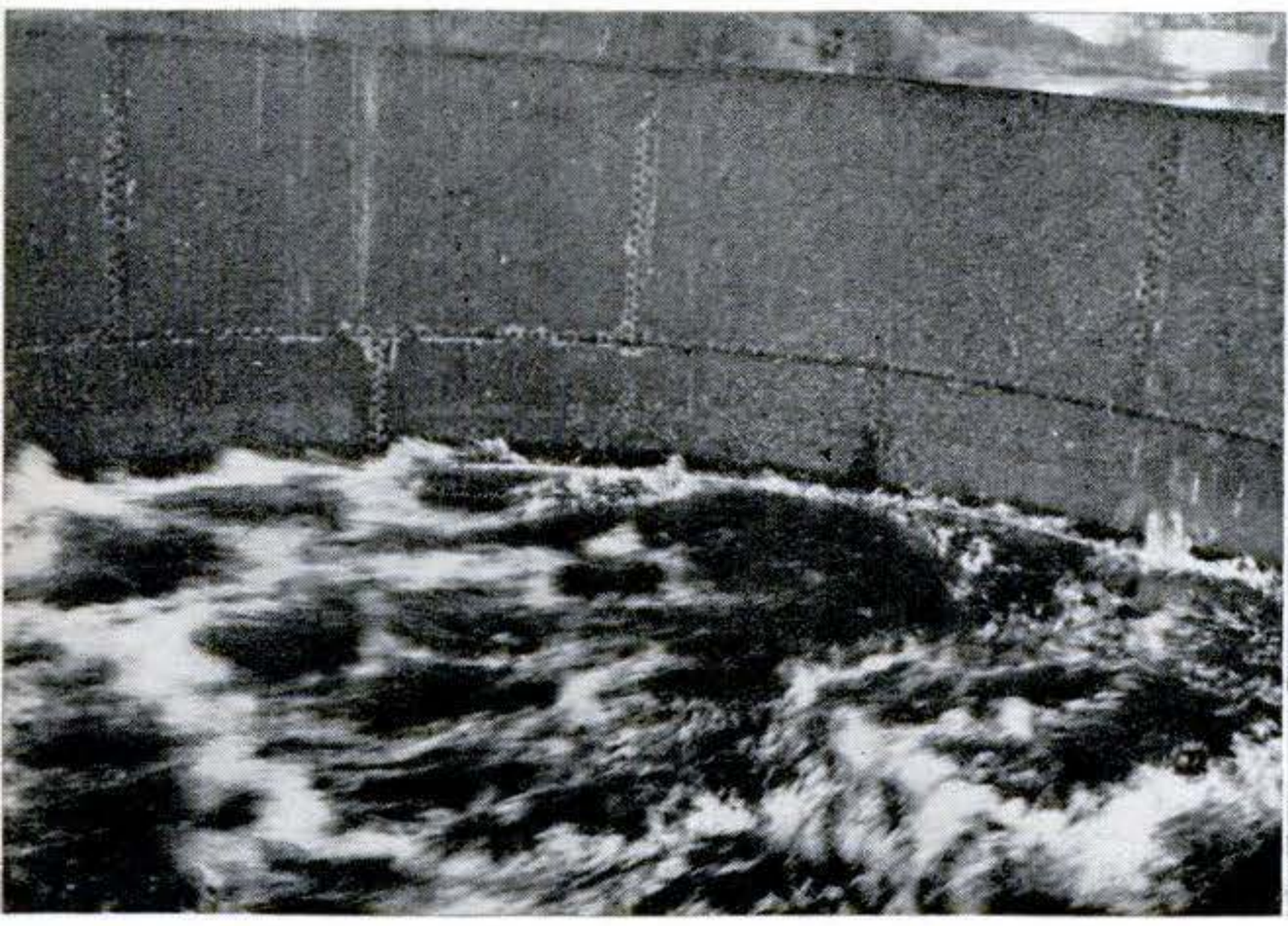


Copyrighted material

**FLAMES DIE** on turbulent surface as air, injected from bottom, brings cooler liquid to top.



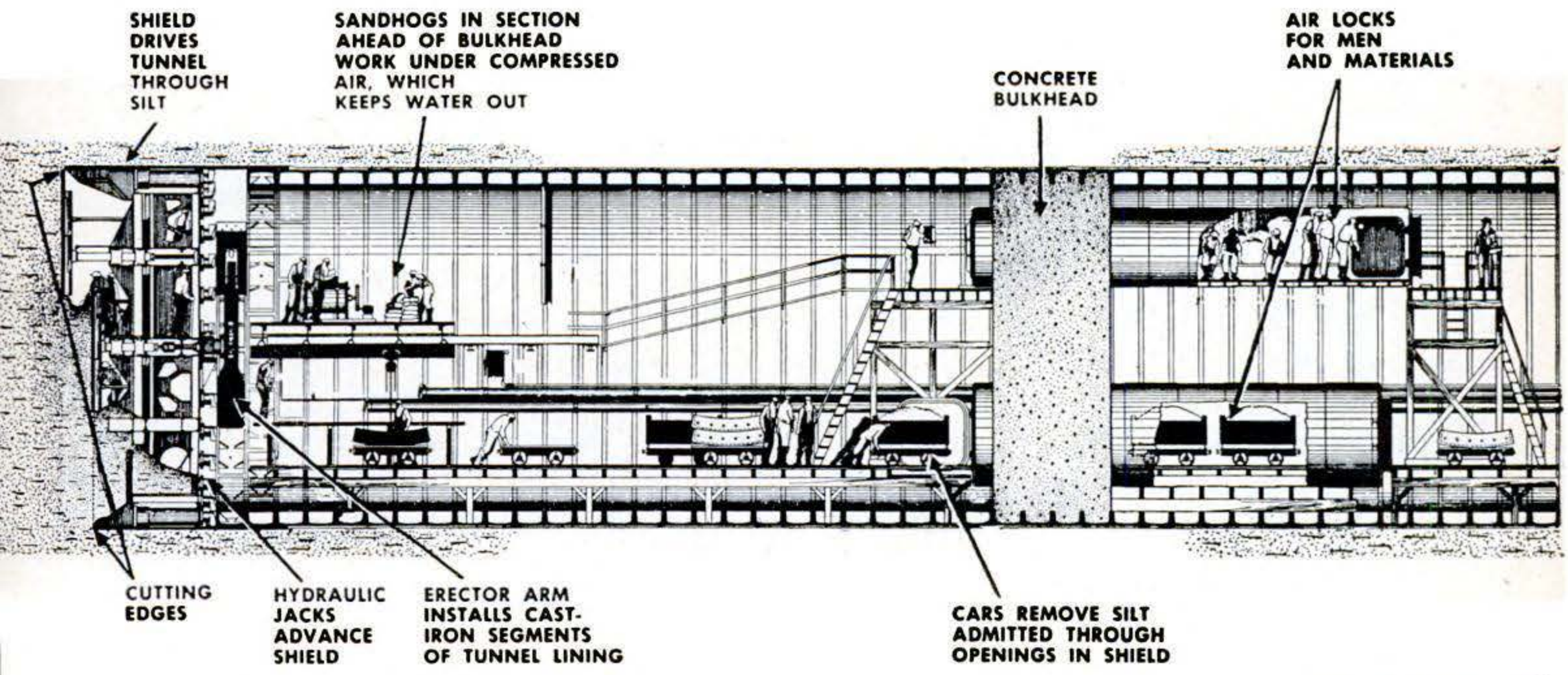
**IN FIVE SECONDS,** injection of air, through pipe entering bottom of tank, has put out fire.



**AIR INJECTION,** in this case, does not put out flames but quells them to 12-inch height.

**WITH FLAMES SUBDUED,** firemen can reach rim of tank and use foam to finish putting out fire.

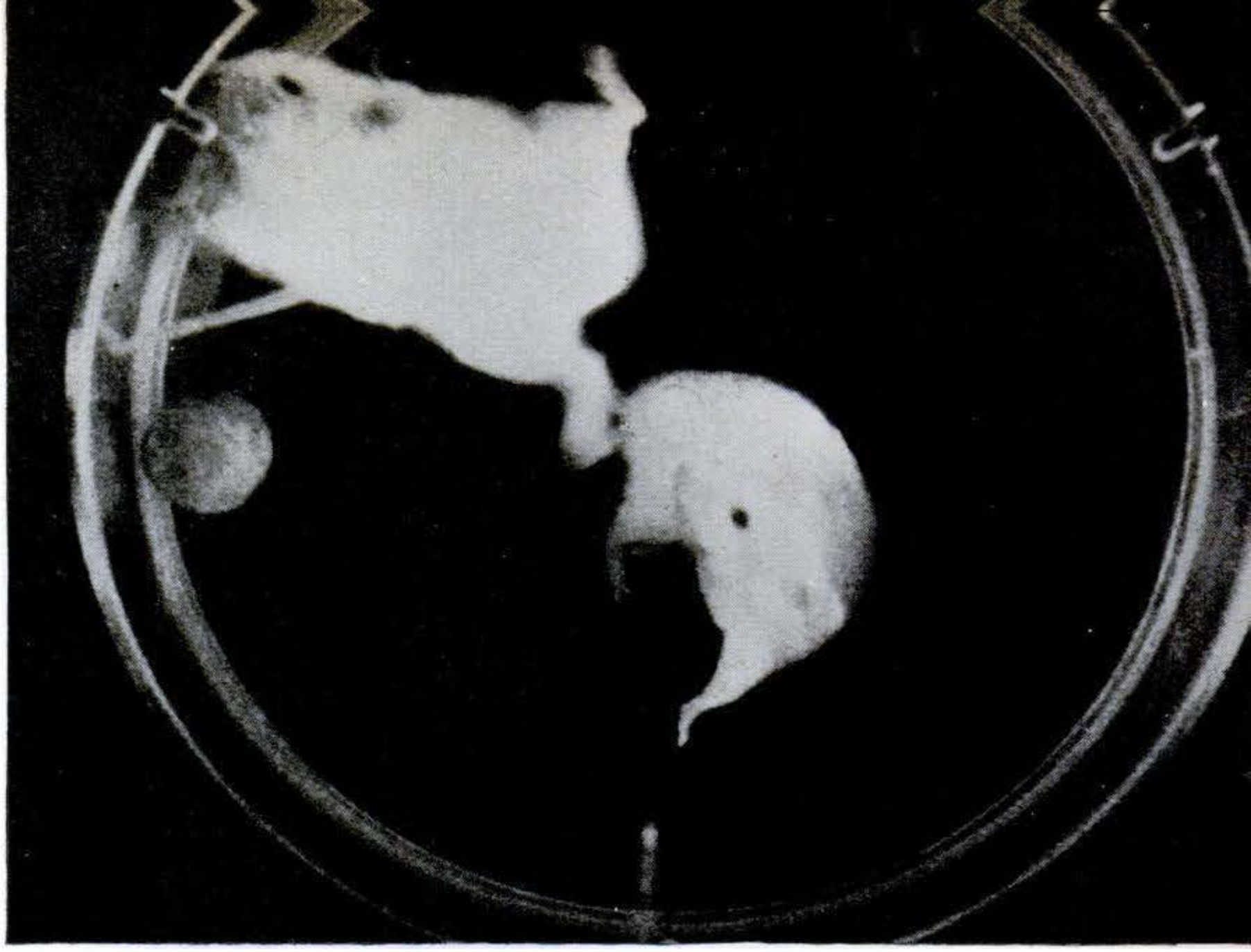
traffic links with New Jersey. It will share the same portal on the Jersey side (left below) and provide six lanes in all, with four carrying rush-hour traffic in one direction. Proceeding just as if the other tubes were not there, sandhogs will drive the new one by the standard shield-and-compressed-air tunneling method (right below).





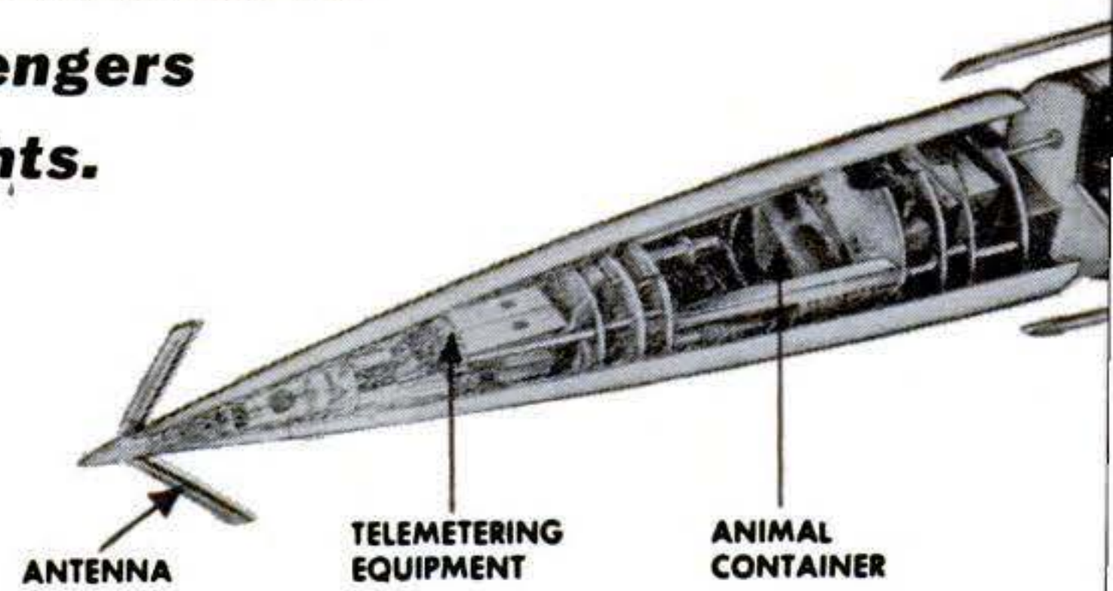

Copyrighted material

**WEIGHTLESS MICE** have tough time during 37-mile fall from Aerobee rocket, as shown in nearest movie frame at right. During zero-gravity period, mouse in a smooth drum is seen floating in air, while his companion in another drum is able to orientate himself by means of a small shelf to which he clings. Ball also is suspended in air. At far right, parachute drag has given mice back their weight. Both are behaving normally again, and ball is supported by drum wall.



# Can We Live Without Weight?

***Space travelers will have to learn to do without it. Mice are blazing the trail now as passengers in Air Force's high-altitude rocket flights.***




TO TRAVEL and live far beyond the atmosphere that envelops our earth, men will not have to evolve into spindly legged, bubble-headed, antenna-eared monsters such as you have seen pictured in science fiction. Research now under way indicates that when men venture into space they will, in effect, take a friendly environment with them.

The first voyager to the moon, for example, will take along air to breathe, food to eat, water to drink, air conditioning to protect his body from extreme temperatures, and protection against cosmic, solar and meteoric bombardment. He will thus create around himself a little earth away from earth.

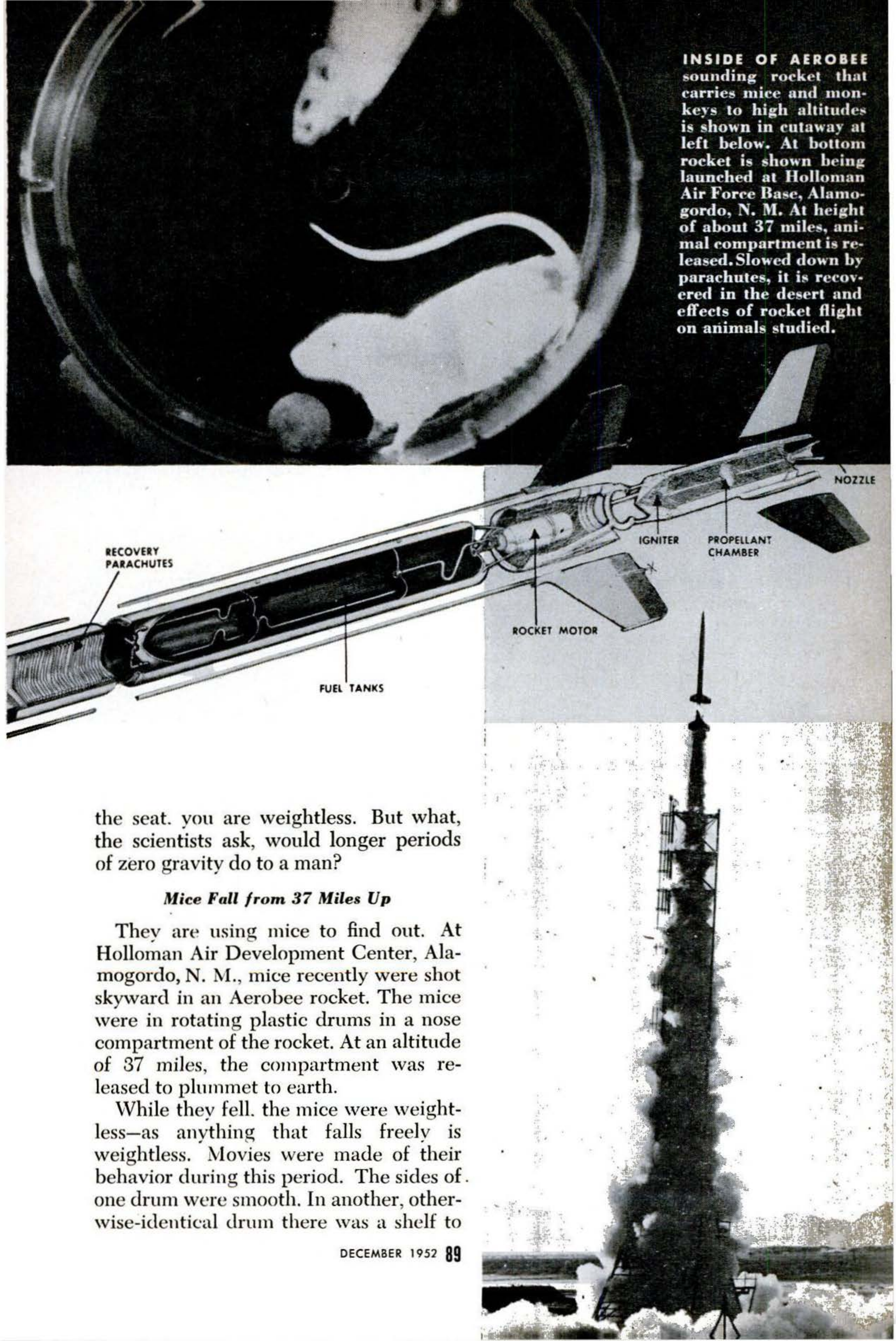
This will be necessary because a man is a very delicately adjusted mechanism.

But everyone who sets forth for another part of the universe will leave one thing behind—his weight. On the moon, the space traveler will regain one-sixth of it. On Jupiter, he will find that he weighs twice as much as he did on earth. But, while in space, the interplanetary tourist will be weightless, because he will be in what students of space medicine call "the state of zero gravity."

This eerie state is being studied now. Everyone, says Dr. James P. Henry of the Aero Medical Laboratory, Dayton, Ohio, has been in it briefly. When an elevator drops suddenly and you feel those stomach flutters for a few seconds, you are weightless. When a swing reaches the top of its ride and you no longer touch



Copyrighted material



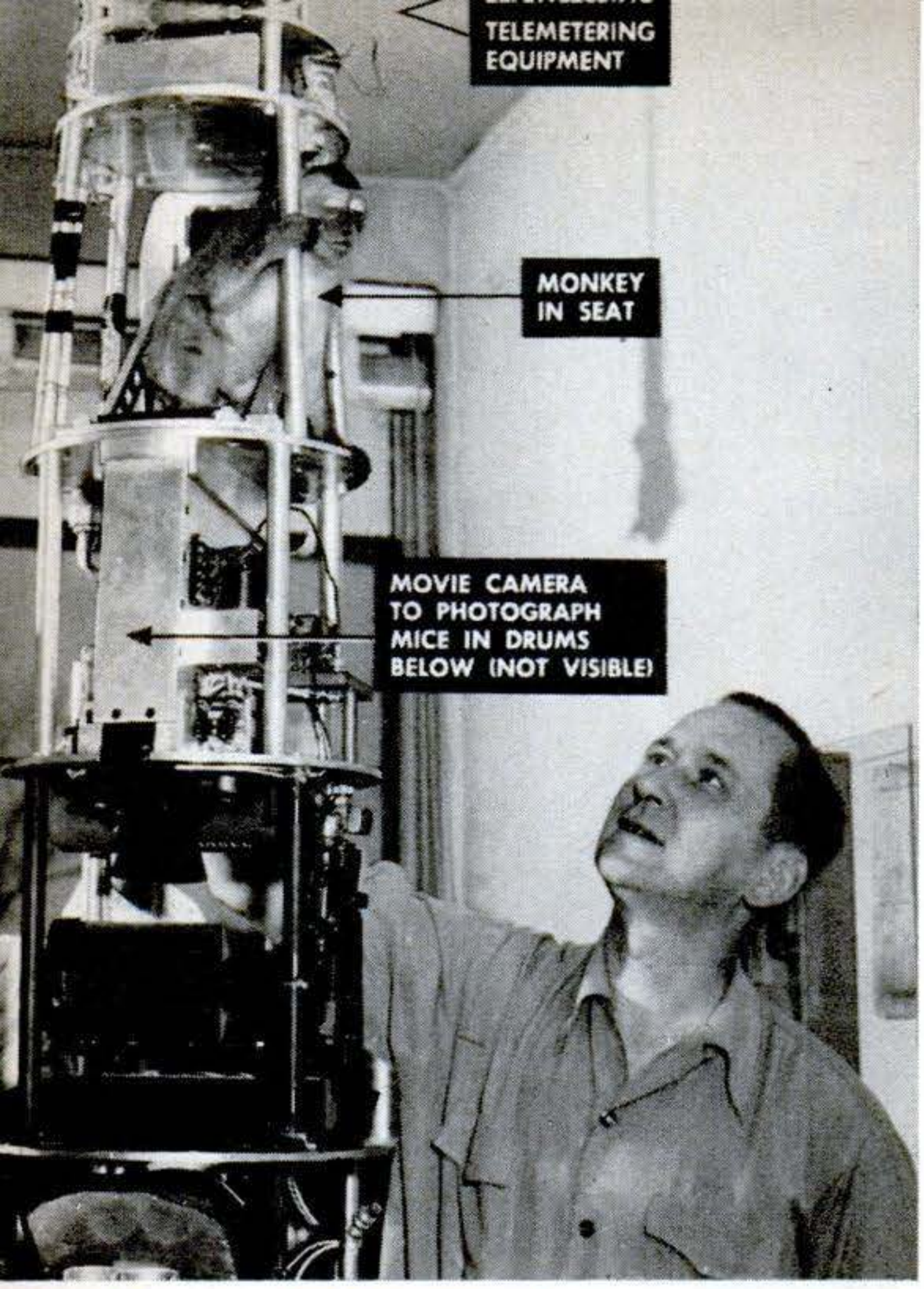

**INSIDE OF AEROBEE** sounding rocket that carries mice and monkeys to high altitudes is shown in cutaway at left below. At bottom rocket is shown being launched at Holloman Air Force Base, Alamogordo, N. M. At height of about 37 miles, animal compartment is released. Slowed down by parachutes, it is recovered in the desert and effects of rocket flight on animals studied.

the seat. you are weightless. But what, the scientists ask, would longer periods of zero gravity do to a man?

### *Mice Fall from 37 Miles Up*

They are using mice to find out. At Holloman Air Development Center, Alamogordo, N. M., mice recently were shot skyward in an Aerobee rocket. The mice were in rotating plastic drums in a nose compartment of the rocket. At an altitude of 37 miles, the compartment was released to plummet to earth.

While they fell. the mice were weightless—as anything that falls freely is weightless. Movies were made of their behavior during this period. The sides of one drum were smooth. In another, otherwise-identical drum there was a shelf to




**ANIMAL COMPARTMENT** that goes into nose of Aerobee rocket is compact. Monkey will be strapped into upper seat, will not show effects of weightlessness as will mice free in drums.

which a mouse could cling. And the pictures show that the mouse in the smooth drum became completely disoriented and floated in space, whereas the mouse in the other drum clung to the shelf and remained nonchalant.

Neither mouse showed any ill effects afterwards, either from acceleration forces which multiplied its weight 15 times when the rocket took off, or from the period of weightlessness during its descent.

### *If Mice Can Live, So Can Man*

Hence, "it is possible." the Air Research and Development Command has concluded, "for a mammal to function within the range of normalcy during rocket flight."

The Air Force is conducting such experiments, not because it contemplates interplanetary flights soon, but because the new high-speed, high-altitude jet aircraft that are now being perfected will subject pilots to periods of weightlessness. These experiments, says Dr. Henry, the senior project officer, bear out the conclusions of interplanetary-flight dreamers that in space men will have to have some means of orienting themselves. They will have to be strapped while standing or seated, and have railings to help them walk about inside a rocket ship.

### *Man Must Take Environment with Him*

Such experiments, however, have not cleaned up the problem completely. Dr. Henry and his colleagues do not yet know, for example, what hours or days of weightlessness would do to a man's mind. As Dr. Henry puts it, "these mice-missile experiments into weightlessness leave us about as far away from actual space travel as primitive man paddling on a log was from the superliner *United States.*"

Civilized man is not very tough. That, says Dr. Henry, is why man, when he reaches out into harsher frontiers, doesn't adapt himself so much as he relies on a protective environment. An example is the new Air Force base at Thule ("farthest land") in Greenland (PSM, Nov., '52, p. 161). Life is no bed of roses in Thule, but the Air Force and Army engineers have air-lifted and sea-transported and created an environment that brings living within comfortable limits of human endurance.

### *Air Force Previews Space Suit*

In space flight the rocket itself will supply that environment. For emergencies, space suits might be carried. The Air Force's new T-1 emergency pressure suit, pictured on the opposite page, provides a preview of what such a space garment might be like. It supplies super-charged oxygen and body counterpressure to protect a pilot in case his cockpit pressurization should fail in the upper atmosphere. If this happened without protection above 63,000 feet, his blood would boil, bloating him with steam and causing death in a matter of seconds.

Man's mechanism operates to very



Copyrighted material

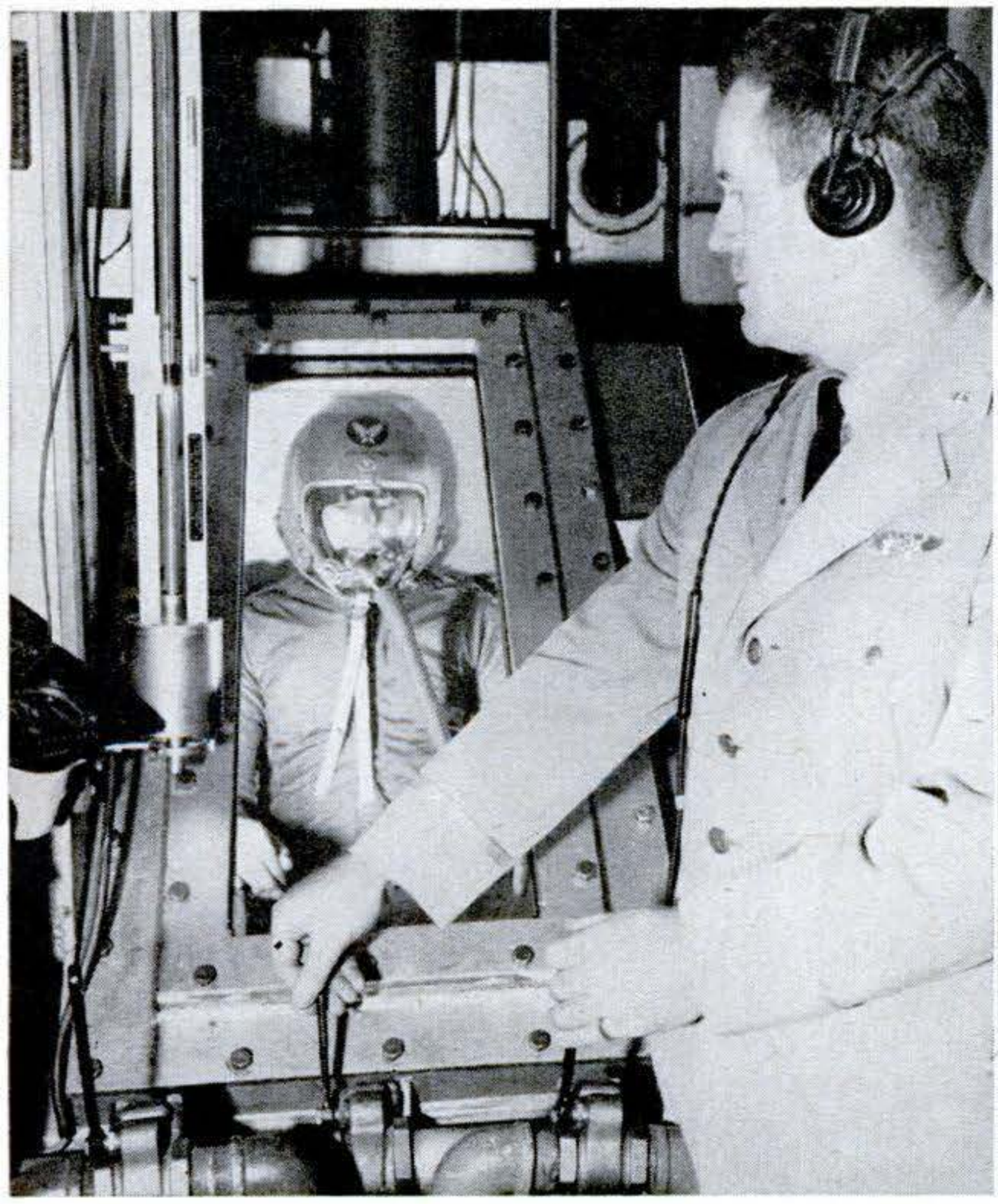
close tolerances, Dr. Henry points out. Internal temperatures, for instance, can vary by only about plus or minus one degree for comfort. *Primitive* man can endure a fairly wide range in his environment. He can function reasonably well with outside temperatures varying as much as 25 degrees either way; go without water for two to three days, without food for 10 to 20 days, without sleep for two to three days.

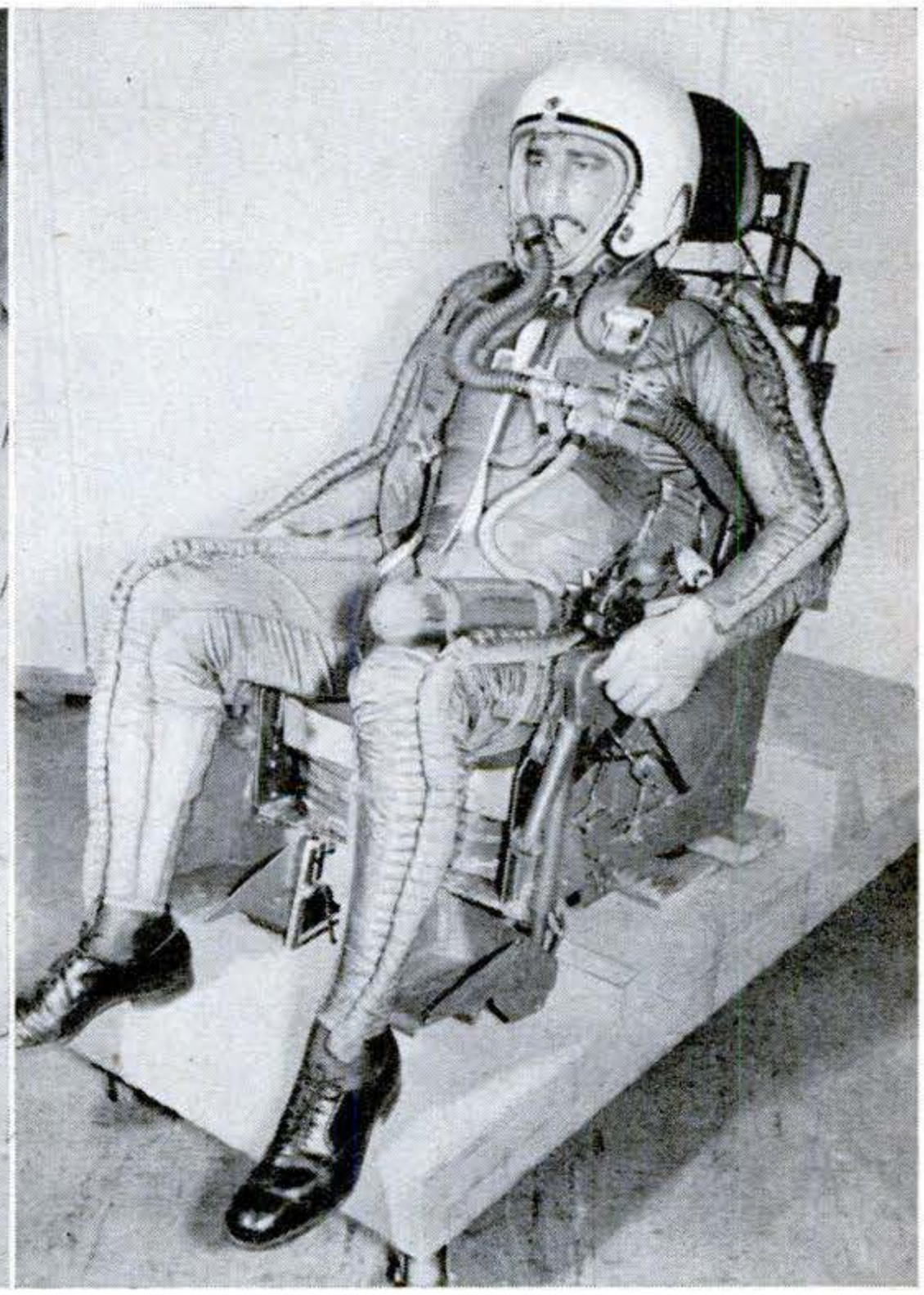
### *Moon Travel Still Far Off*

*Civilized* man in society has created for himself a much milder environment. He still lives within a wide variation of natural temperatures, but he protects himself by light clothing in summer, heavy in winter, heated houses and air conditioning. Food and water he takes every four hours while awake; he gets eight hours of sleep a day. This environmental protection of clothing, vehicles and dwellings, Dr. Henry adds, has enabled civilization to spread out from warm, fertile river valleys and live in deserts, polar caps, on the sea and on high plateaus.

Because such a favorable environment must be provided in a vehicle that will travel to the moon, much research must be undertaken. Milton W. Rosen, the Navy's rocket expert, recently threw cold water on the enthusiasm of those who dream of interplanetary trips by declaring that "at present we cannot even estimate the feasibility of building a successful manned rocket."

The optimists, nevertheless, refuse to be daunted. Dr. Wernher von Braun, the German scientist who worked on the V-2s and is now serving as a rocket expert for the U. S. Army, declared on the same occasion that we would be traveling in space within the next 10 or 15 years.—*Herbert O. Johansen.*





**SPACE SUIT? Well, almost—it's the Air Force's new pressure suit that will enable pilots to live in case cockpit pressure should fail in near-vacuum of upper atmosphere. Altitude chamber at left enables test pilot to "ascend" to more than 50,000 feet while learning to use the suit. Actual space suit may be patterned after this model.**



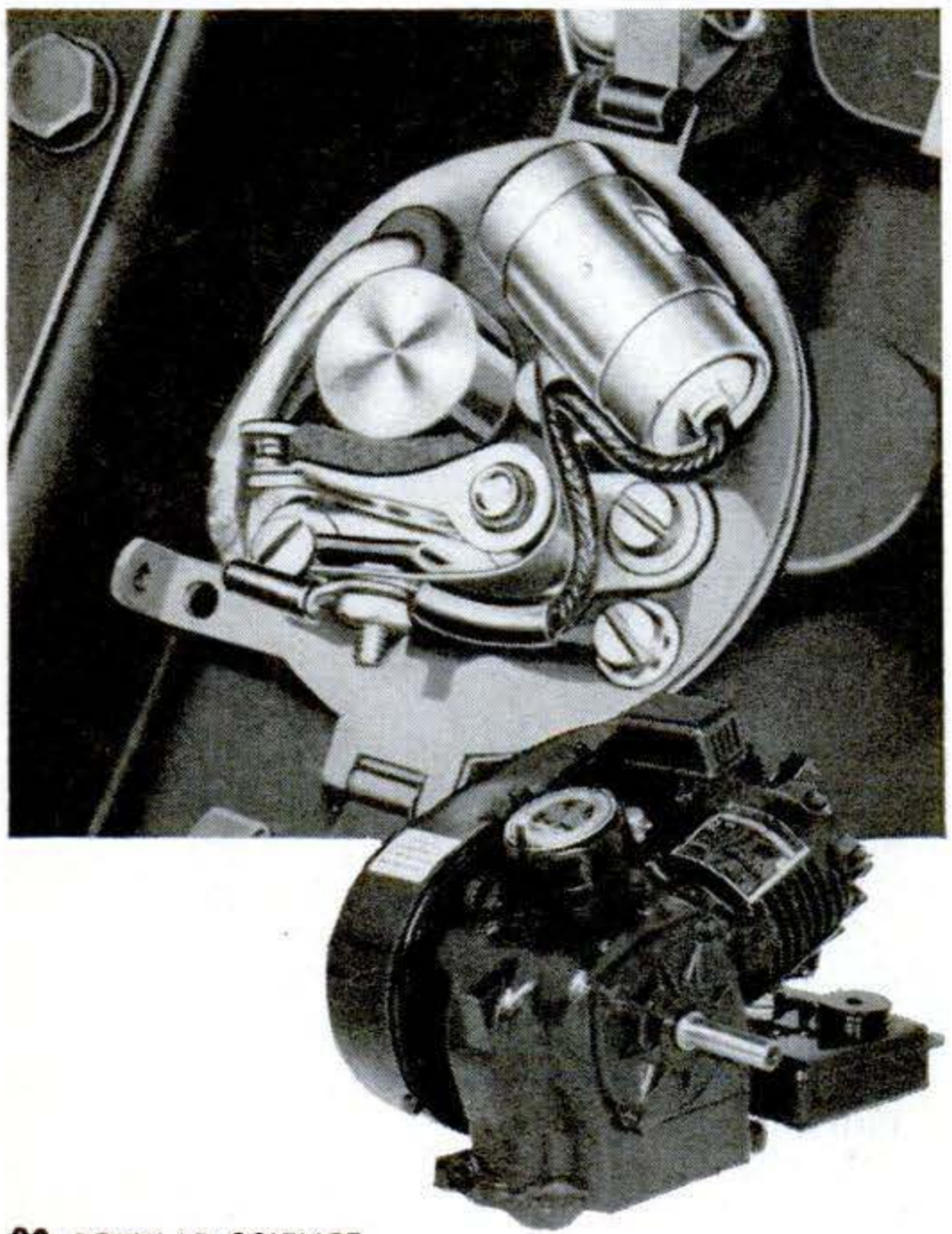
Copyrighted material

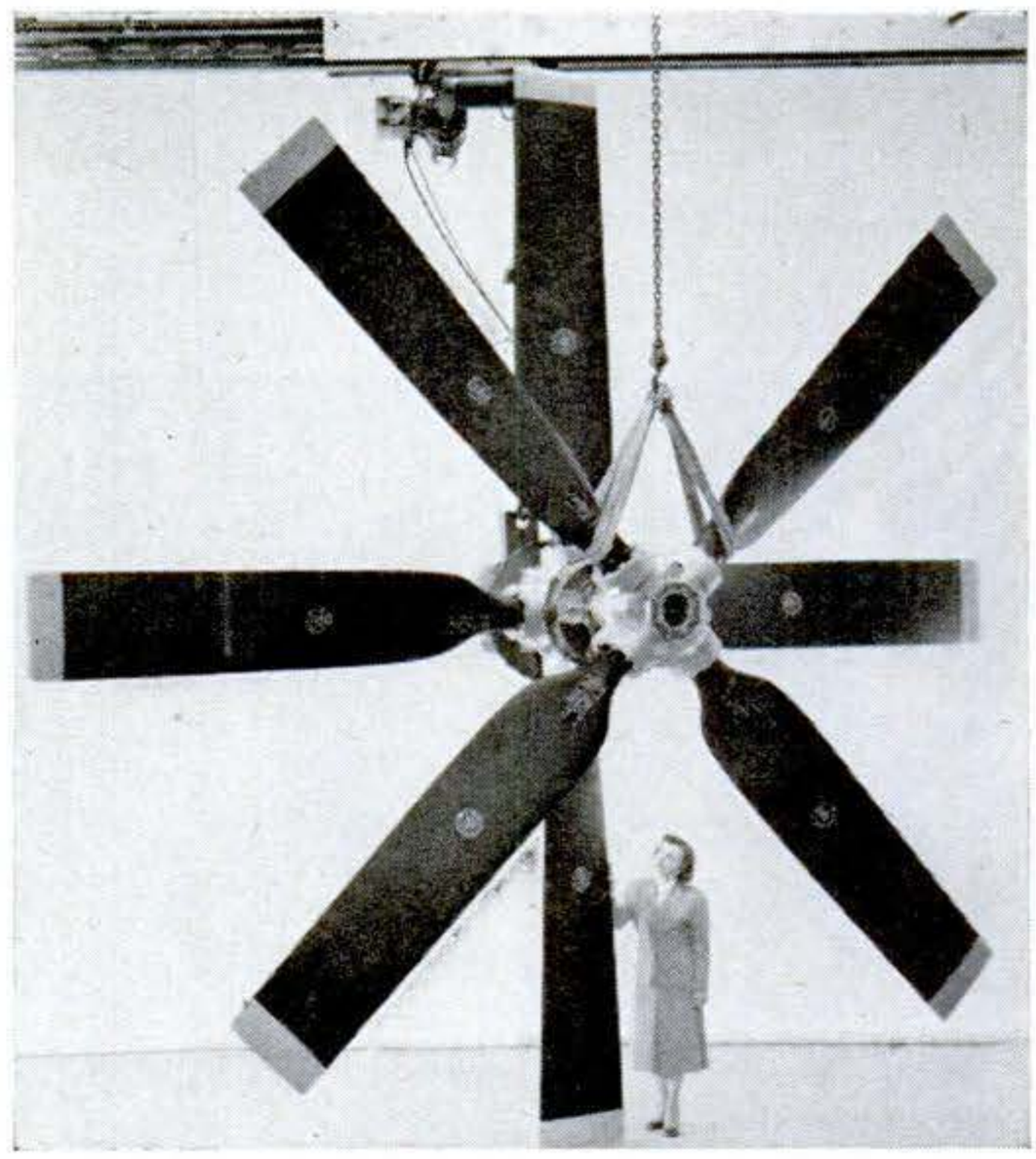
## Office Merry-Go-Round Keeps Track of Airline Seat Reservations

EVER wonder how they keep plane reservations straight? Here's the way one airline does it. Trip charts, arranged in sequence by days, hang from electrically driven belts (left). When a reservation call comes in, the clerk pushes a toggle switch to run the belts right or left and bring the proper chart to hand. Space to check in reservations on 1,638 upcoming flights is provided. The Motorack is in use by United Air Lines at Denver.

## One-Lunger Has Points Outside

ADJUSTING the ignition system of this new air-cooled engine is a cinch. Its breaker points and condenser are mounted outside the crankcase (below). Thus shroud and flywheel need not be removed to service points. The cam that actuates the breaker is driven off the camshaft, the points operating at one-half engine speed. Points last longer since every second spark is not wasted as in the usual four-cycle system, according to Continental Motors Corp.





## Props Aim at Jet Speeds

PROPELLERS like the one above, driven by a new gas-turbine engine, are expected to fly long-range military aircraft at jet speeds—and may pave the way for propellered speeds up to 1,000 m.p.h. Although details are secret, it is known that propellers (whose tips spin at supersonic speeds) are available that can harness a power output of 20,000 horsepower. Advantages of turboprop over pure jet are greater fuel economy, greater take-off thrust and the braking effect of reverse propellers for short-run landings. The new turboprop engine is being developed by Curtiss-Wright.



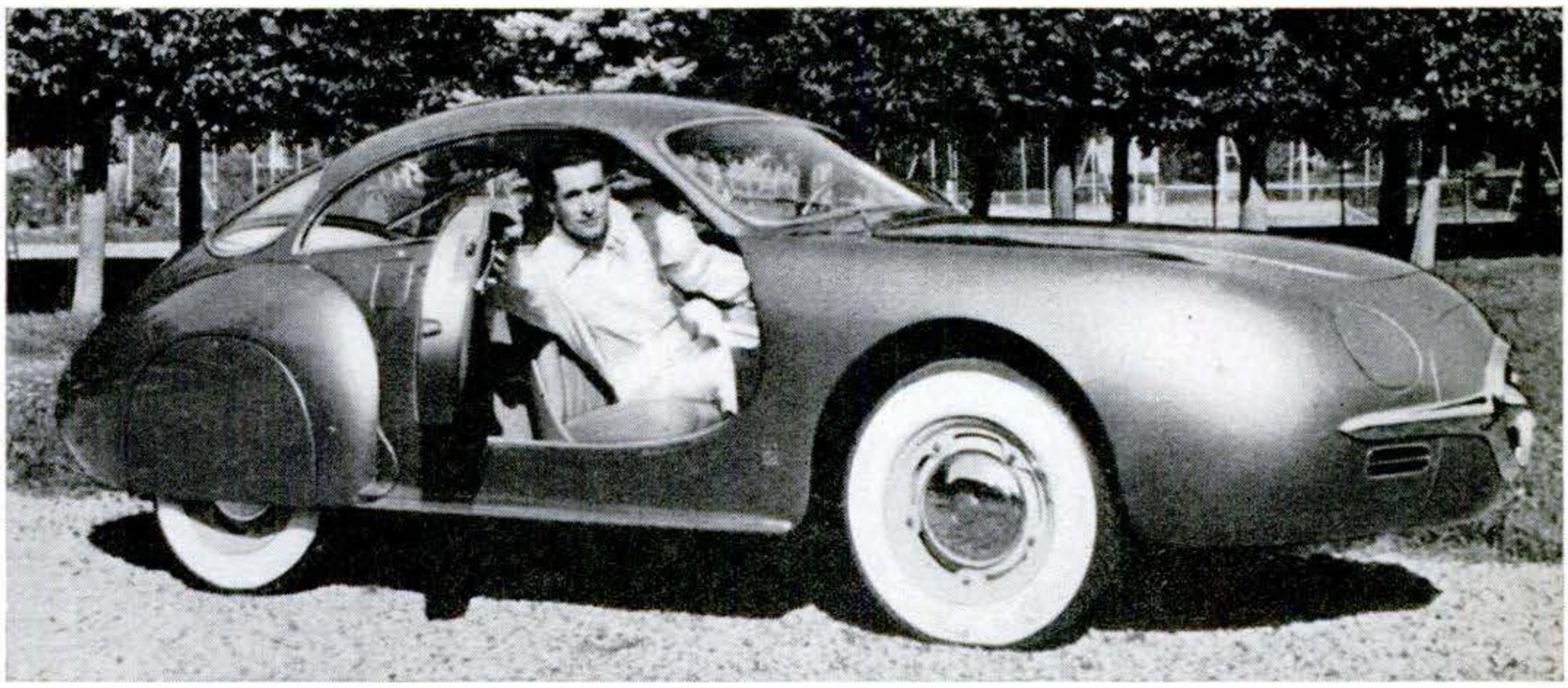
Copyrighted material

**DASHBOARD HAS CLOCK (left), speedometer (right), and a glove compartment below handbag hook. Left-hand controls are clutch and gearshift; right-hand, throttle and brake.**

## Dressed-Up Scooter Goes Places in Style

THE world's first motor scooter with a car-type dashboard—housing a speedometer, clock and glove compartment—has made its appearance in this country. The NSU-Lambretta isn't the fastest scooter (PSM, Dec. '51, p. 164), but it may be the most luxurious. It has such features as a dimmer switch on the headlight, an illuminated panel, a steering-column lock and a hook for handbags. The one-cylinder, 4½-hp., two-cycle engine can do 50 m.p.h. The importer is Butler & Smith, NYC.

**LATEST LAMBRETTA SCOOTER is fancied-up with automobile accessories. Good for 100 miles per gallon, it has wide footboard, high leg shield, tubular frame.**



## French Test Gas Turbine on Car, Plan to Use It in Trucks

GAS-TURBINE cars, of which Britain's Rover was the pioneer example, are now being developed in France as well. With a 100-horsepower gas turbine installed, the test car above is said to have reached 120 miles an hour. The Socema Research Co., which developed the engine, plans to use it in trucks and other heavy vehicles.



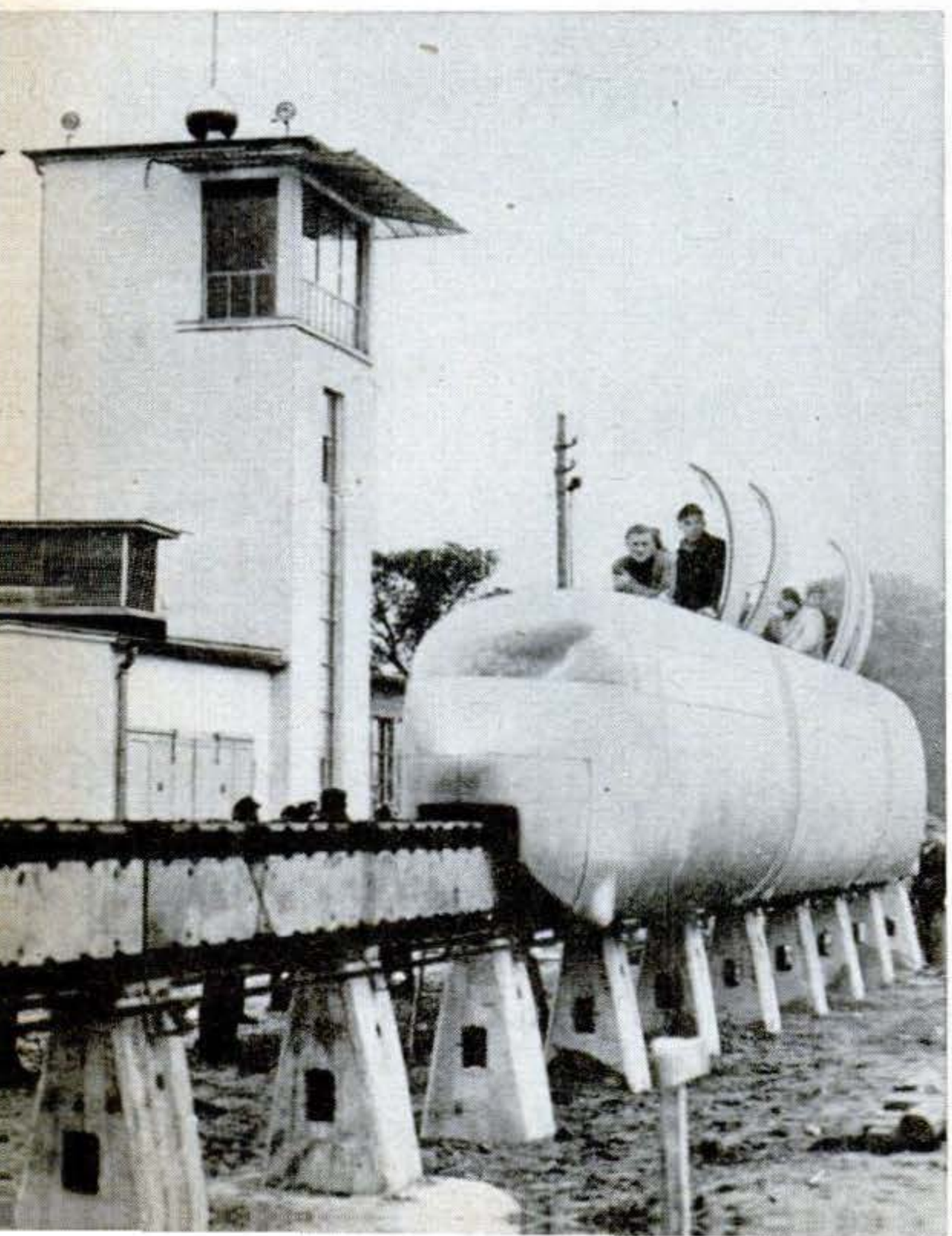
Copyrighted material

**AT 60 M.P.H.,** passenger-carrying model of streamline monorail train hits a steeply banked curve. Turns of same radius would limit a conventional train to about 18 m.p.h. Performance of high-speed "train of future" was demonstrated recently at Cologne, Germany.

# Will This

TO MAKE travel on land as fast as by air, a monorail train invented in Germany is designed to race at more than 200 m.p.h. along a track of radical new design. At a preview, spectators recently watched trials of a passenger-carrying scale model on a mile-long "monorailway" constructed at Cologne, Germany, with the backing of Axel Wenner-Gren, Swedish multimillionaire.

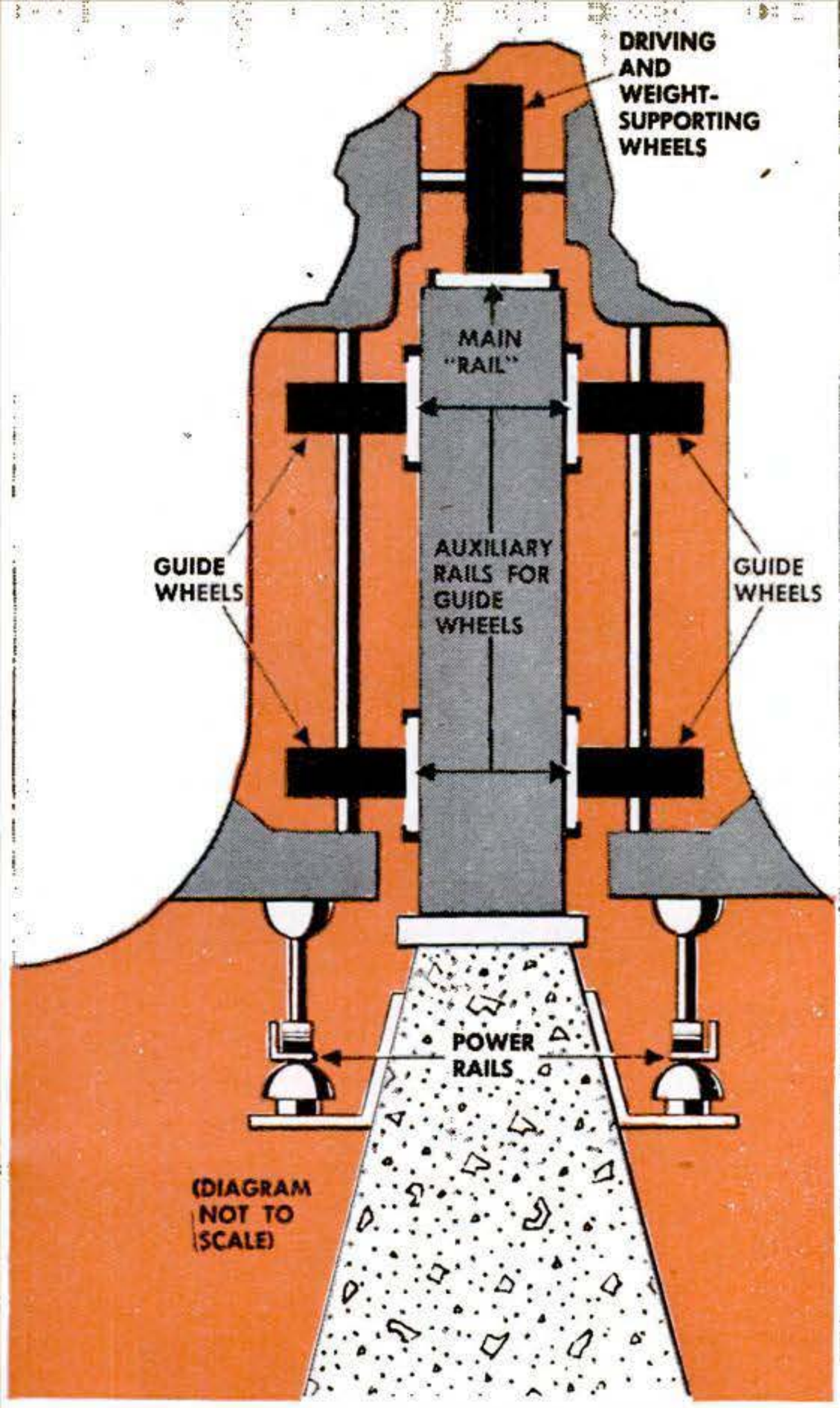
Two-fifths of the projected size, the model train is a three-section streamliner, with a

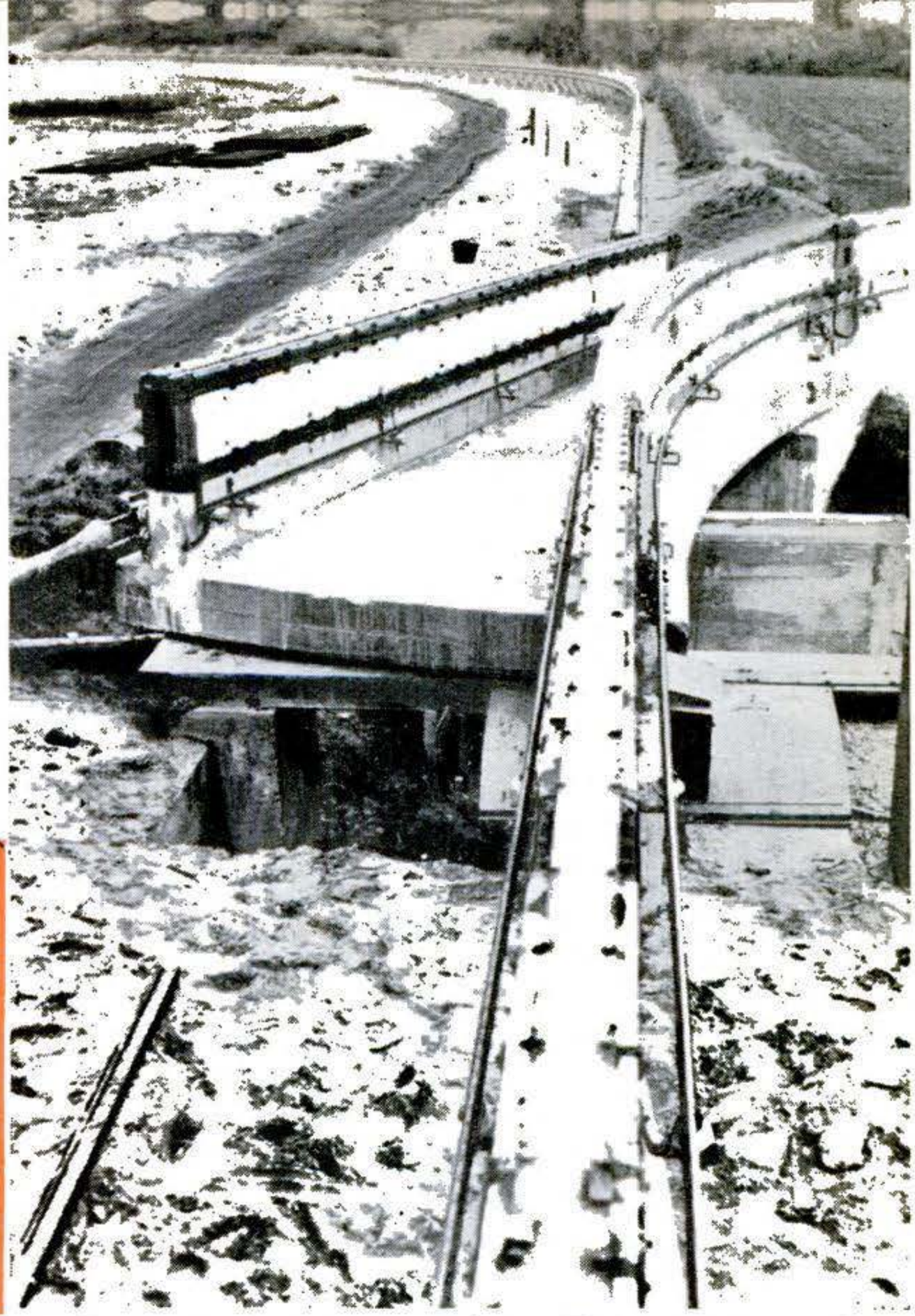


**PASSENGERS BOARD COACH,** whose top-hinged panels are raised to admit them, for trial high-speed run of the monorail streamliner. Control tower of system is just left of train.



Copyrighted material



**HOW TRAIN CLINGS TO TRACK** is seen in diagram above. Guide wheels keep main wheels centered on top "rail" and give lateral support against toppling. Driving motors draw current from twin power rails. Switch, in photo at right, is simpler than two-rail type.

# Train Top 200 M.P.H.?

coach between power cars. Passengers get on and off through openings provided by lifting panels of the coach's body.

The train's lower half, containing its running gear, literally wraps itself around the special track. Flangeless wheels along the cars' center ride a main "rail," a flat metal ribbon atop a continuous block of reinforced concrete. Guide wheels on vertical axles of the running gear engage similar metal ribbons, extending in pairs along the sides of the concrete block.

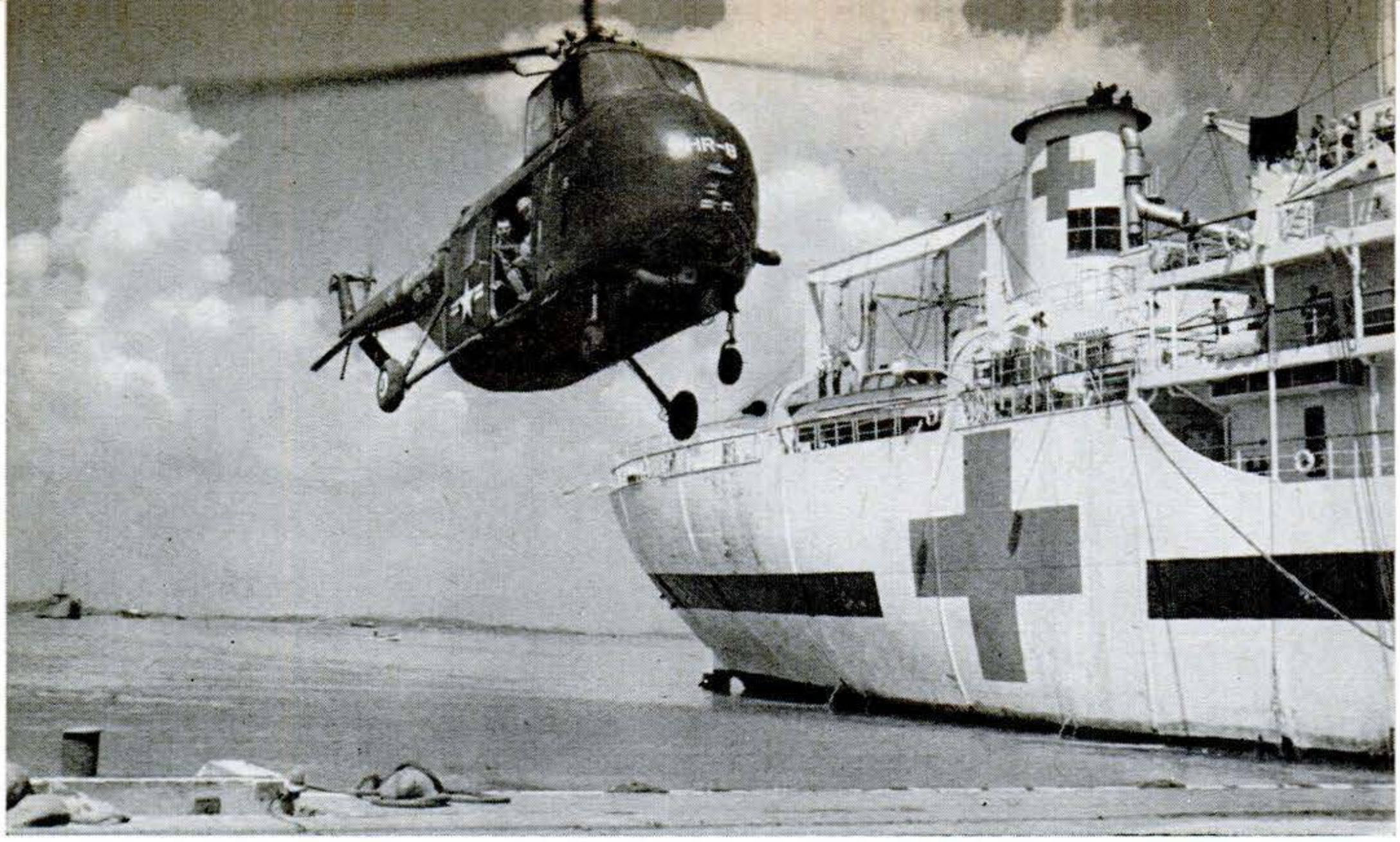
Turned by electric motors, the driving wheels of the train exert tractive force upon the top rail, which also supports the train's weight. The guide wheels and auxiliary rails hold it centered on the top rail.

Because of the lateral support given by the guide wheels, the train cannot tip over, even if it should be stopped upon a curve banked at an extreme angle for high speed. This key feature eliminates the complication of using a gyroscope, as earlier monorail-train designers attempted to do, to balance a car upon a single rail.

In its trials, the model train has attained 95 m.p.h.—a "scale speed" said to demonstrate the feasibility of the full-size train's predicted speed of 200 m.p.h. And as for switching trains from one track to another, a switch built into the test layout actually proves to be simpler, mechanically, than the type used with conventional two-rail track. END



Copyrighted material



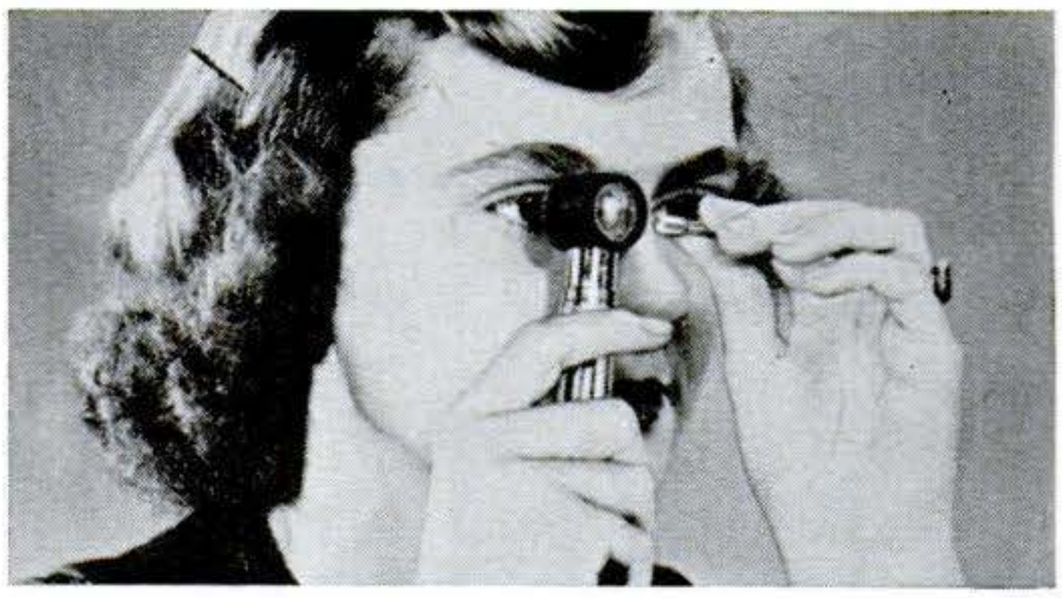
## Floating "Arms" Receive Airborne Wounded in Korea

STRETCHED out on each side of the hospital ship USS *Haven,* seen above anchored off the Korean coast, are large pontoon floats which serve as landing strips for Marine helicopters bringing in wounded men straight from the fighting front. Medical corpsmen on the floats start administering the vital blood plasma as soon as each helicopter unloads. The process continues while the wounded are taken aboard ship.

## 75 years ago this month

***Popular Science Monthly reported:***

"THERE was exported from China to Europe, in the year 1875, the enormous amount of sixty tons of human hair. This hair is ostensibly the product of the sweeping of barber shops, but there is little doubt that much of it represents 'pigtails' feloniously snipped from their wearers' heads."

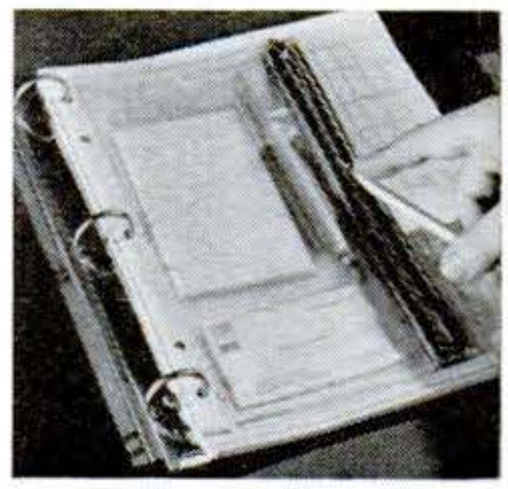


## Pocket Magnifier Lights Up

THE 10-power magnifier this girl is using weighs only 2½ ounces, clips to a pocket like a fountain pen and has a built-in lamp powered by two penlight batteries. The light shines through the lens onto the object without obstructing the user's vision. Bausch & Lomb make the magnifier.

## Plastic Pocket Fits Notebook

THIS plastic pocket snaps into a loose-leaf notebook to keep writing tools handy. Made by Renick Boggs & Co., 412 N. Orleans St., Chicago, it has a zipper opening.





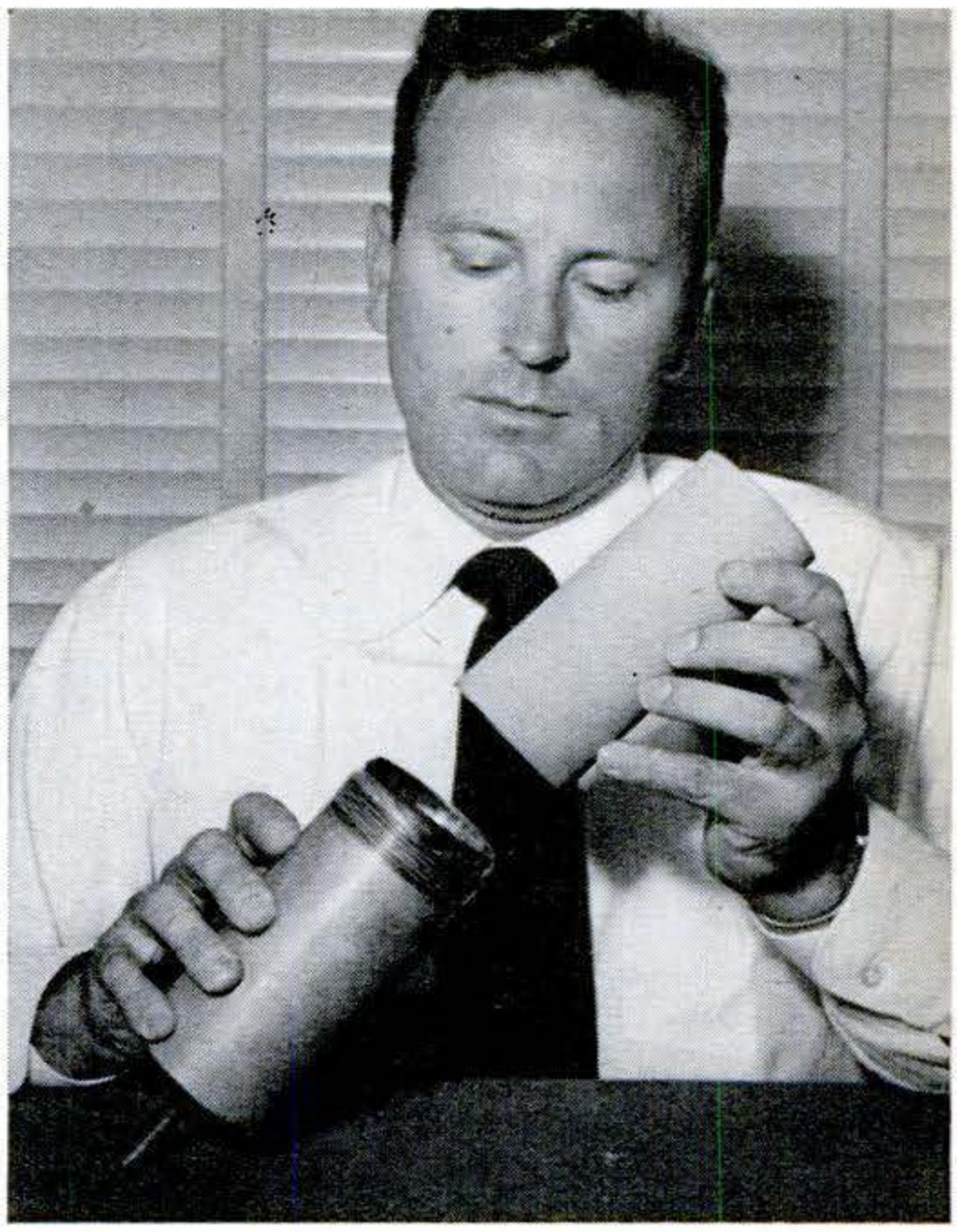
Copyrighted material

## Pinwheel Motor Keeps Guided Missiles Steady

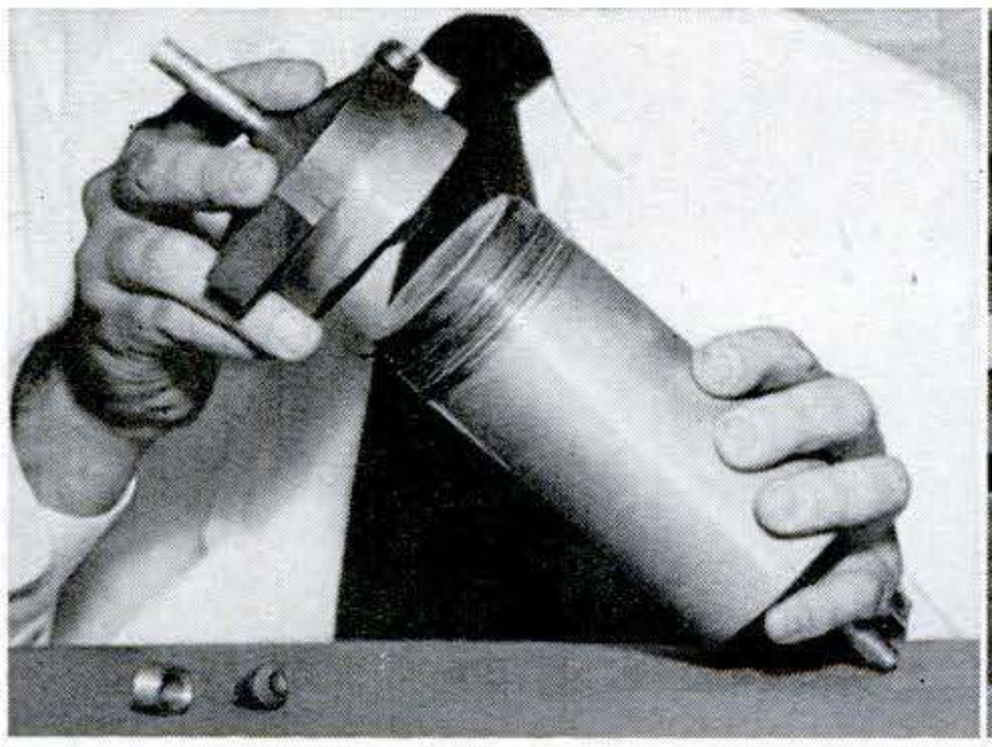
A ROCKET motor only 5½ inches long and weighing 3½ pounds may soon be making sure that air-to-air guided missiles land smack on their targets. It is designed to do two important jobs: supply power for the missile's "brain"—the radar or TV set in its nose—and maintain pressure in the hydraulic system that controls the missile's tail surfaces.

An invention of Jack Zillman, a California research engineer, the Whirlajet is a tiny gas-driven turbine spun by the thrust of exhaust from a burning stick of propellant. It would be built into a section of the missile case.

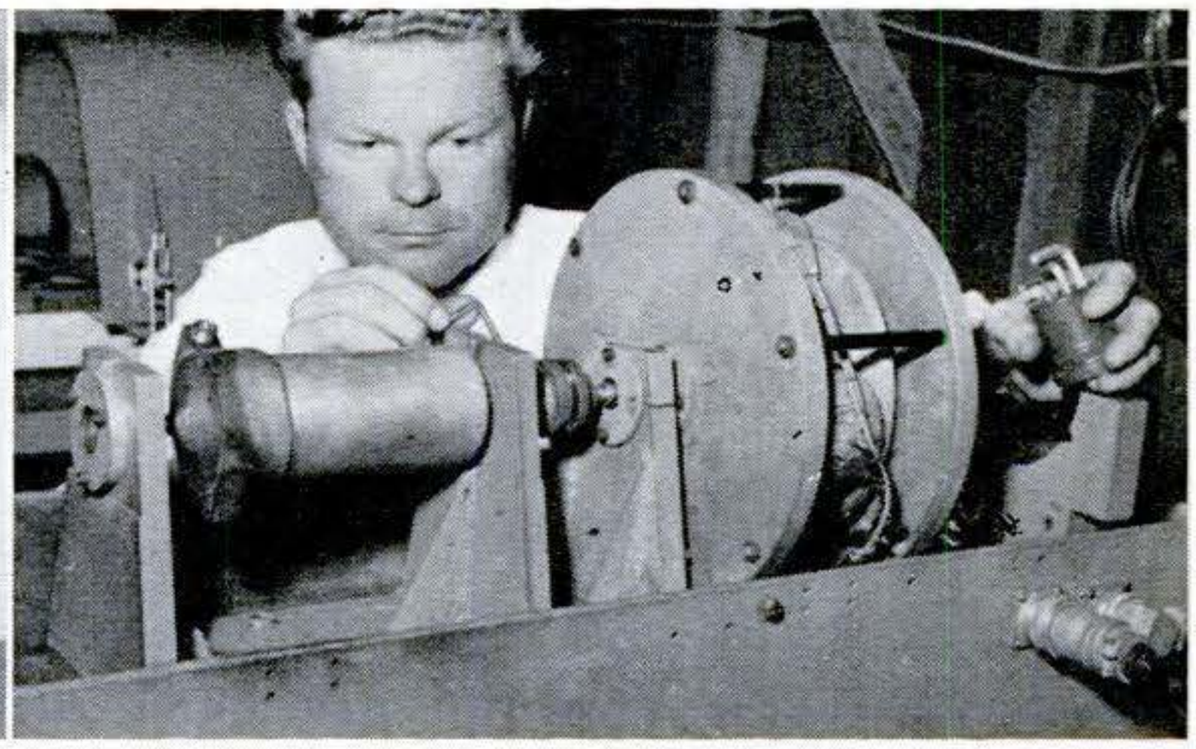
The little rocket motor, not yet in production, has only four parts: barrel, into which a cartridge of plastic or rubber is fitted; cap; and two tiny nozzles. To start the motor, which can provide 20 horsepower, an operator switches on a heater wire in the motor by remote control, thus igniting the rocket's solid fuel.



**1 A POUND OF FUEL, in the form of a cartridge, is about to be fitted into a Whirlajet barrel by Jack Zillman, who invented the motor.**



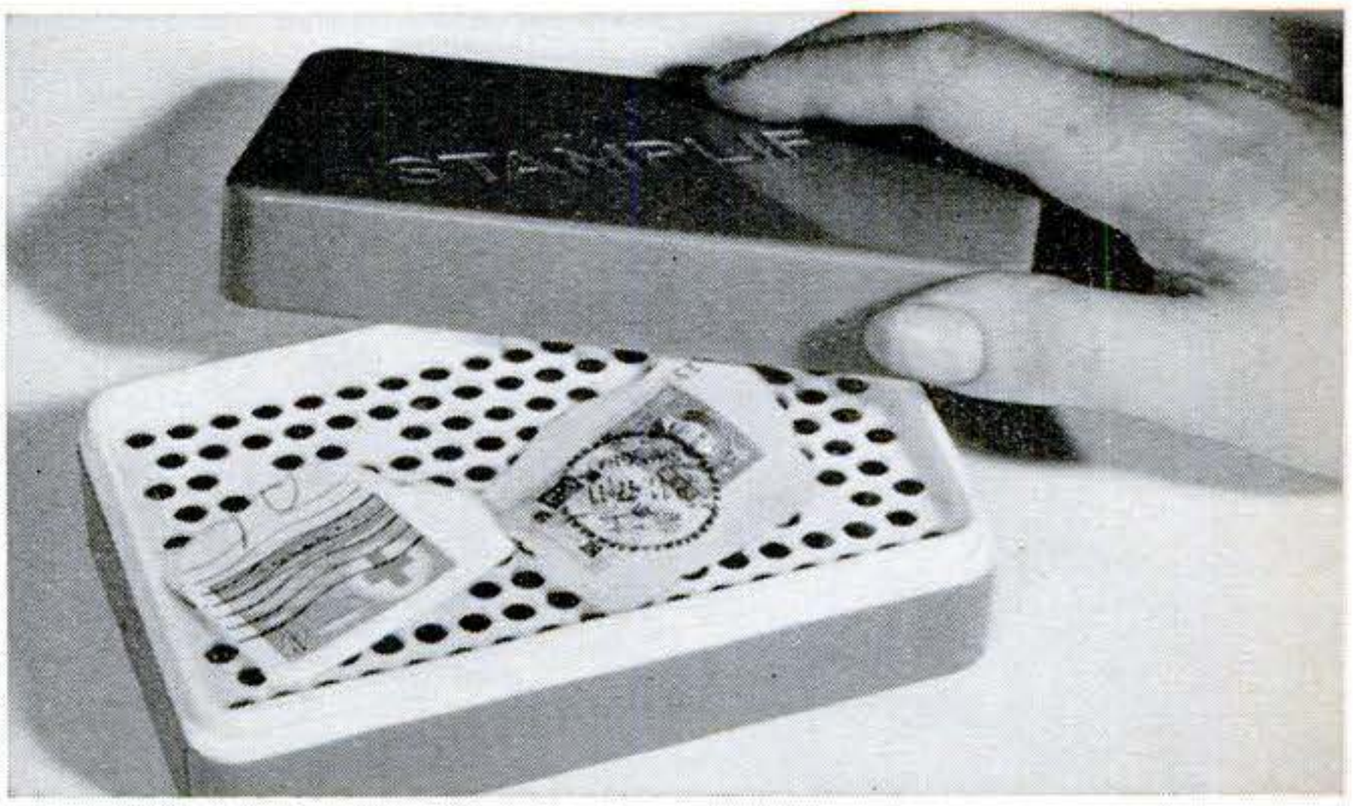
**2 EXHAUST NOZZLES are in the side of this cap, ready to be screwed on. Thrust of exhaust gases spins the entire motor on its end shafts.**



**3 TORQUE AND SPEED of a Whirlajet are measured by letting it blast against a dynamometer. Motor runs four minutes.**

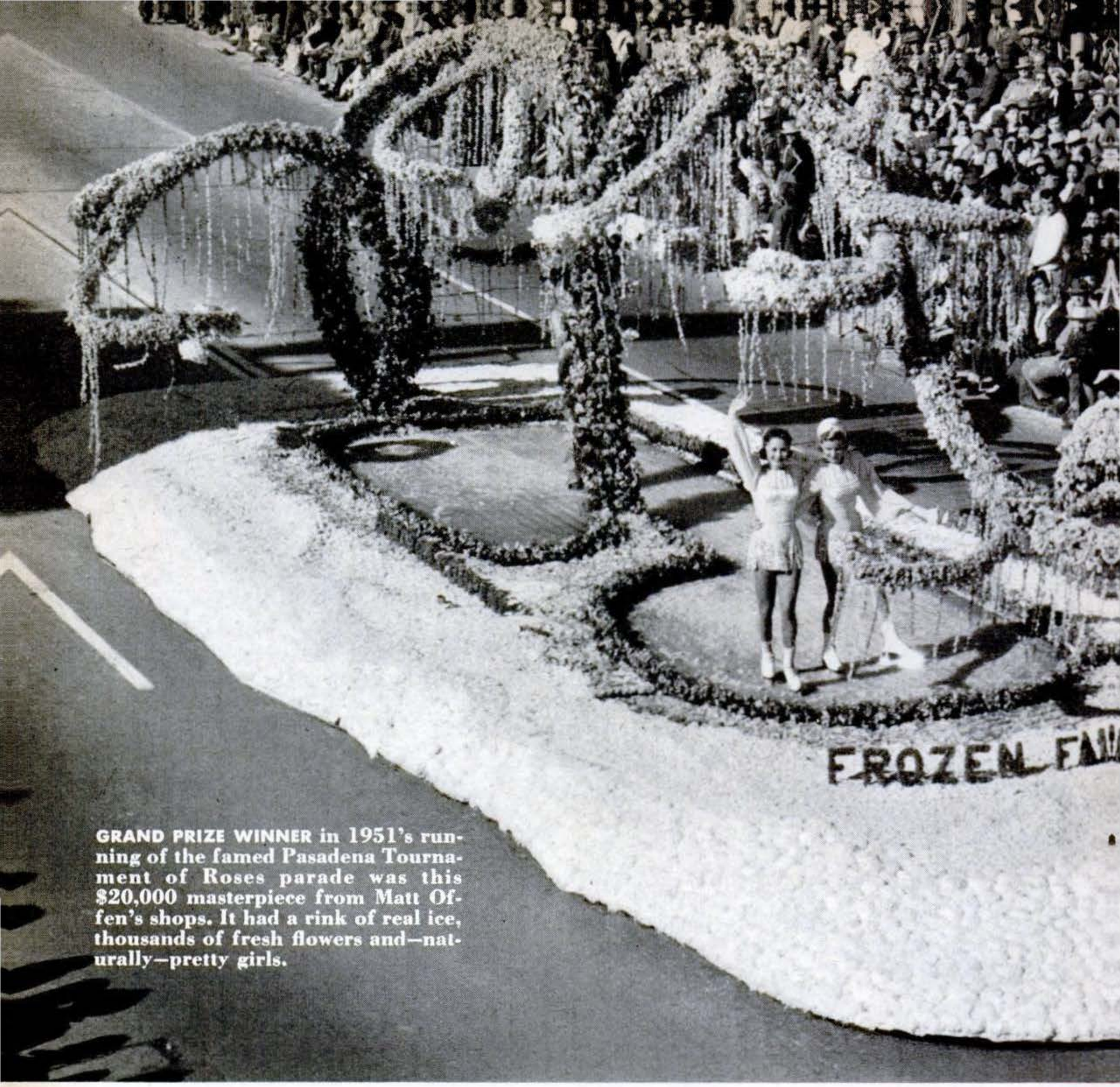
## Cold-Water "Steamer" Removes Stamps

PLACE canceled stamps cut from envelopes on the perforated plastic tray at right, put the cover on and in 25 minutes you will be able to peel the stamps off easily. Moisture from water-soaked felt pads under the plastic does the trick. General Designing Service, Box 167, San Francisco, makes this aid to stamp collectors.



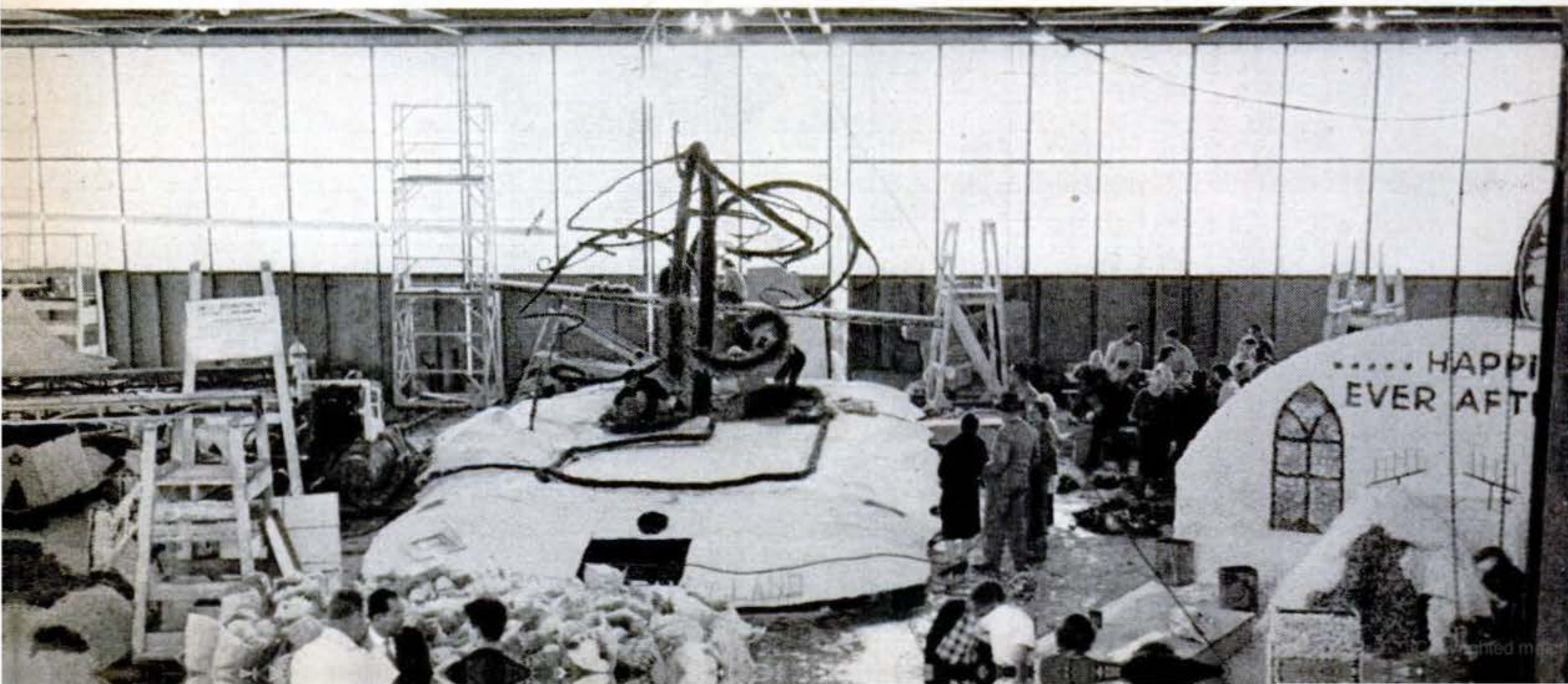


Copyrighted material

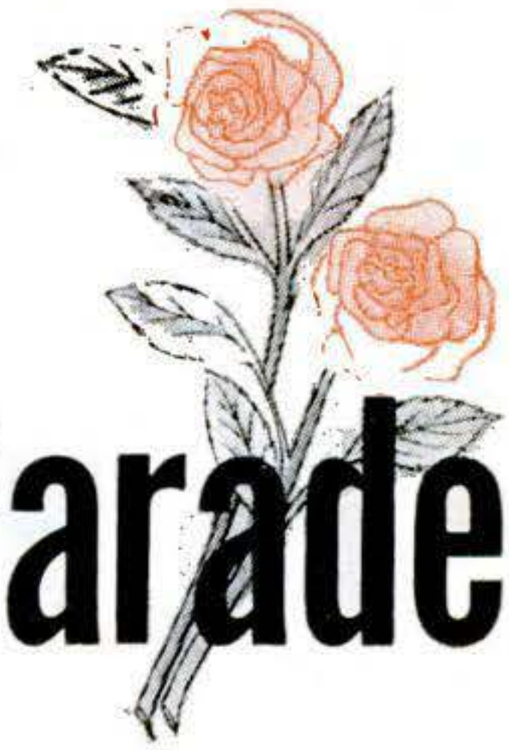



**GRAND PRIZE WINNER** in 1951's running of the famed Pasadena Tournament of Roses parade was this $20,000 masterpiece from Matt Offen's shops. It had a rink of real ice, thousands of fresh flowers and—naturally—pretty girls.

**THAT DUBIOUS-LOOKING HEAP** of materials in the center of the photo below grew into the spectacular creation above in Offen's hangar-like plant. Here it is actually half done, with drive motor and refrigerating unit installed. Rectangular hole in front was cut for driver.



# His Floats Lead the Parades



***Matt Offen, top man at building these flower-decked behemoths, has 400 workers turning out 60 a month at prices up to $20,000.***

**By Darrell Huff**

BANDS boom, troupes of trained horses prance by and 60 motorized flower shows, gracefully animated with pretty girls, glide down the palm-lined avenue. It is New Year's Day morning in Pasadena, Calif., and 2,000,000 pairs of eyes—not counting TV and newsreel cameras—are watching the fabulous Tournament of Roses parade that precedes the Rose Bowl football game.

This being the day after New Year's Eve, many of those eyes will have a bleary look. But just about the reddest-rimmed will be the blue eyes of burly, blond Matt Offen.

Matt will not have been to bed for two days and nights.

It's that way every year for the ex-athlete and Navy PBY pilot who now, at 31, is the world's biggest builder of parade floats. These luxuriant, self-propelled behemoths make Pasadena momentarily the glamour center of the world. Some

**THE DRIVER IS NEVER HAPPY buried, as he usually is, in a cramped nest of wire and blooms. To pilot the craft above, one had to lie flat.**

Copyrighted material

**THE BOSS AT WORK** (left) with his happy sales manager at hand. The firm invites orders by long-distance calls, for which it pays, and guarantees its floats against all damage.

**FLOATS START HERE,** on superintendent's drawing board. No formal production line is needed to build them, for they are simply hauled from station to station in two-building plant.

of the best and costliest of them are Matt's work.

Every inch of a Tournament of Roses float must be covered with flowers. Fresh blooms don't keep long. So millions of roses and camellias and orchids must be individually glued into place in the final two or three days and nights.

Of last year's 60 floats, 18 were Matt Offen's work. This year again his Valley Decorating Co. is building more than any other outfit.

### *Poker Helped*

Out of service and back home in Fresno in February 1946, Matt found he had saved, or won at wartime poker, about $10,000. Casting about for a business to go into, he came upon a merchant who was eager to dispose of 15,000 flags and a stock of bunting that had been gathering dust. Matt bought them and rented a 15- by 40-foot basement. Rodeos, homecomings and festivals revived so fast that he did $13,000 worth of street-decorating business that year and $60,000 the next.

One day a committeeman from Fresno's annual Mexican celebration dropped in and asked Matt if he made floats.

"Why sure we do," he said, and set about learning how. Matt and his wife and his father built that first float in Matt's back yard. When their $150 experiment copped first prize, Matt knew he had something big.

It was clearly too big a business for a basement and a back yard. Matt leased a pair of one-time Air Force motor-maintenance buildings six miles from Fresno. These, along with the branch quarters at Alhambra, now house his space-eating enterprises, which employ more than 400 people at the peak season.

In these tall, big-doored buildings, floats are turned out at the imposing rate of 60-odd a month. These mass-produced floats are quite different from the self-propelled monsters of the Pasadena parade. Basically they are trailers, often with small aircraft wheels. They are pulled by trucks. You see them at local celebrations all over the West. They are the bread-and-butter of the float business. For about $500, for example, Matt will design a float to suit a client town or company, build it, and generally take care of it all summer. If the client wishes, he will provide a truck and driver to haul it. He'll store and refurbish it between parades.

All this is economically feasible because the float remains Matt's property. After it has served for a season he can tear it down and use the chassis again. And although each superstructure is a



Copyrighted material

**LETTERS ARE CUT OUT,** and small decorations, too, with portable electric saws. Power tools, paint sprayers and welding equipment are the principal "machinery" used to build floats.

**SPRAYERS ARE BUSY** practically all the time, for many floats are either plastered or cocooned, and colors usually have to be touched up on each stored float as a new season opens.

custom job, he may salvage that, too.

The ordinary trailer float is not much of a construction job really, as Matt sees it. Just chassis and superstructure, mostly of welded steel rods, and then paper and colored metal foil.

### *Frozen Fairyland the Costliest Ever*

Matt's Frozen Fairyland, however, grand prize winner at the 1951 Tournament of Roses, was undoubtedly the most costly float ever built.

It began as an idea: "Let's build a float that has girls skating on a miniature frozen lake." The first trick after that was to find a sponsor interested in putting up $20,000 to build something that most people in the business were already saying wouldn't work.

After seeing sketches and a tiny model, officials of the Union Oil Co. of California agreed that this was what they wanted: a floating ice rink 20 by 48 feet with the highest point of its bed a bare 21 inches from the ground—down where everybody could see everything as it went by. Over this should tower a great snaky tree, a sort of wide-spreading jungle plant of steel covered to the smallest branch with fresh flowers.

Here were mechanical problems that couldn't be solved by cutting up a truck and stretching it out. This one would

**GLUING ON THE FLOWERS,** the final operation on a Tournament of Roses float, is such a delicate job that much of it has to be done by workers stretched out on scaffolding overhead.

have to be built from the ground up, and it was: a chassis welded from structural steel, dual tires, axles of 2½-inch steel to hold the 14 tons.

"People said we couldn't find an engine powerful enough to pull 14 tons



Copyrighted material

and still fit within what we could use of the 21 inches of height," Matt recalls. "Well, we solved that one with a 15-hp. engine geared down 64 times.

"They were sure we couldn't freeze—and keep frozen—300 square feet of ice in the California sun. And if we did, they said it would break at the first bump."

With help from refrigeration experts, Matt finally got a unit built inside the float frame. A gasoline generator powered an electric motor to blow the freezing vapors of 600 pounds of dry ice over a heat-exchanger coil. Another motor kept brine pumping through pipes only 1½ inches apart all through the pond. The ice was suspended independently so it wouldn't crack on the bumps.

But few of the 2,000,000 spectators who saw this float knew, or cared, anything about the steel and mechanical contrivances that made it possible. What they saw was a great pond of clear ice surrounded by a bed of some of the prettiest and most expensive snow you could ask for: specially grown white chrysanthemums. Trimming it were hundreds of delphiniums, cornflowers, camellias, roses, lilies of the valley.

The wide, graceful tree above all this had its welded steel trunk hidden beneath 6,000 orchids and half that many red and yellow roses with maidenhair fern among them. Its branches bore 75,000 sweet peas.

Under the blooms of Frozen Fairyland danced and twirled three skaters, glistening in mirror-studded costumes.

All this went down the avenue of palms without a hitch. Matt Offen stopped sweating and went off to get some sleep. END

**PASADENA IS USED TO THIS** sort of thing. Nevertheless the Offen creation above won lots of attention. The girls, as is customary, were local college beauties and student actresses.

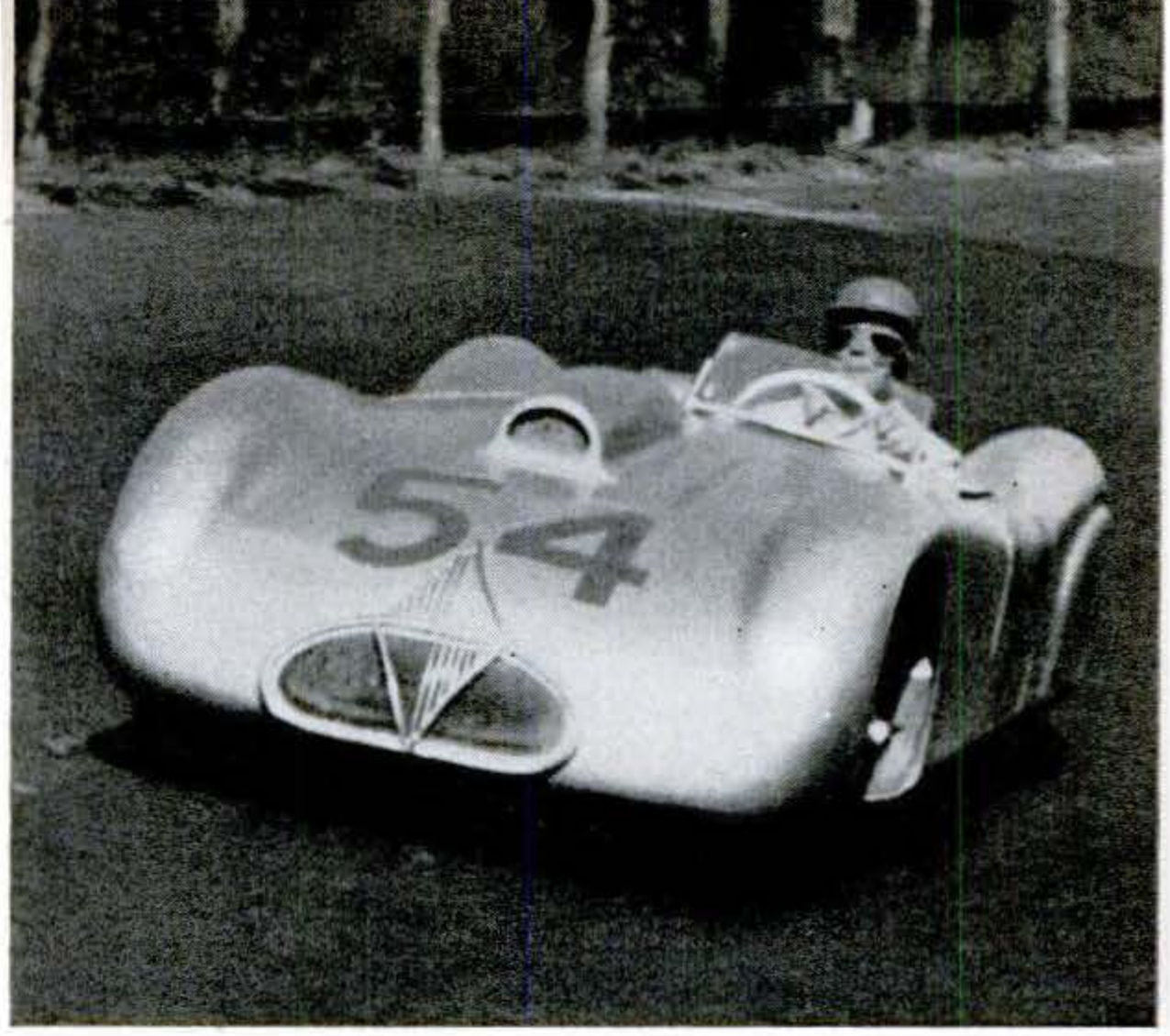


Copyrighted material

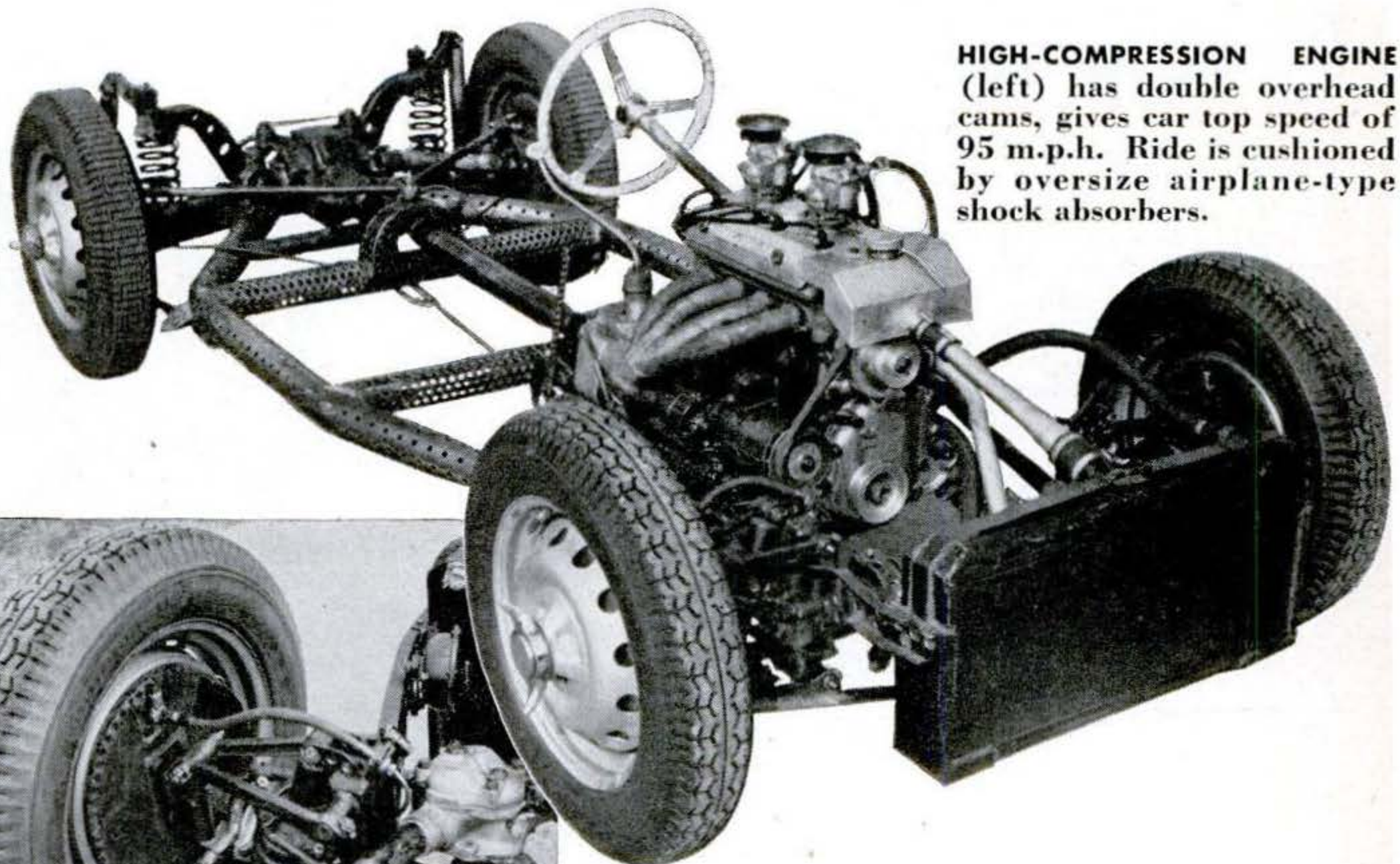
## German Racer Is Testing Laboratory for Stock Cars

THE snout-nose racing car at right is the new German-made Borgward, which won a name for itself in the latest running of the German Grand Prix. But it was designed for a humbler role in life. A four-cylinder car, the Borgward is being used by its builder to try out equipment intended for future sports models in the company's passenger-car line.

The Borgward is currently testing a tubular frame punctured liberally with holes to save weight (below). It also is using aluminum wheels and brake drums.




**CARBURETOR HUMP** in the center of the Borgward's hood is screened, but there are no air filters on top of the two downdraft carburetors. At first there were skirts covering the front wheel housings, but brakes overheated.



**HIGH-COMPRESSION ENGINE** (left) has double overhead cams, gives car top speed of 95 m.p.h. Ride is cushioned by oversize airplane-type shock absorbers.

**COOLER BRAKES** are assured by holes drilled in the braking plates, as seen at left, and by a special air duct in the front of each.

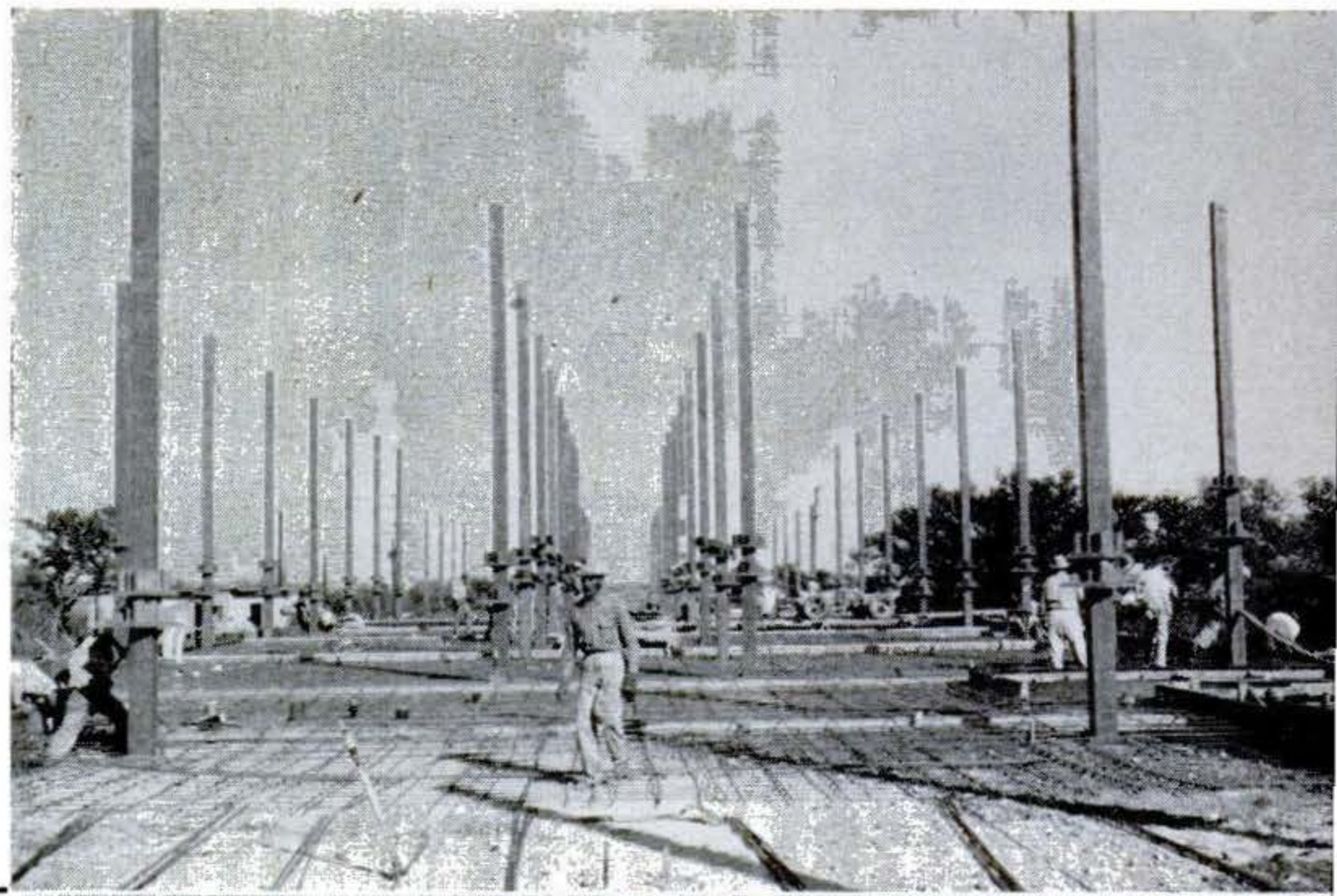
## Heart Valve Replaced by Plastic

IT LOOKS like a toy lantern, but the object the nurse at right is holding is a plastic heart valve, used successfully in a delicate surgical operation at Georgetown University. The valve was inserted in the main artery of a woman's ailing heart, replacing her own valve, damaged by illness.

Copyrighted material

# Three concrete slabs are poured on the ground,

**1 CLASSROOM building for Trinity University, San Antonio, started out this way. Four dozen steel columns were positioned, and reinforcing steel grids laid to receive concrete. Method was conceived simultaneously and independently by Philip Youtz, New York architect, and Tom Slick, Texas oilman. It was perfected in laboratories of Institute of Inventive Research and Southwest Research Institute.**



**2 CONCRETE is poured for the second floor. Collars on steel columns will support roof. Introduced only in 1950, (PSM, Mar. '50, p. 111), Youtz-Slick method already has been used in constructing 100 buildings from Texas to Canada. It saves time, is less costly than conventional methods. One building now contemplated will rise six stories. That, inventors say, is limit to which slabs can be pumped into the air.**



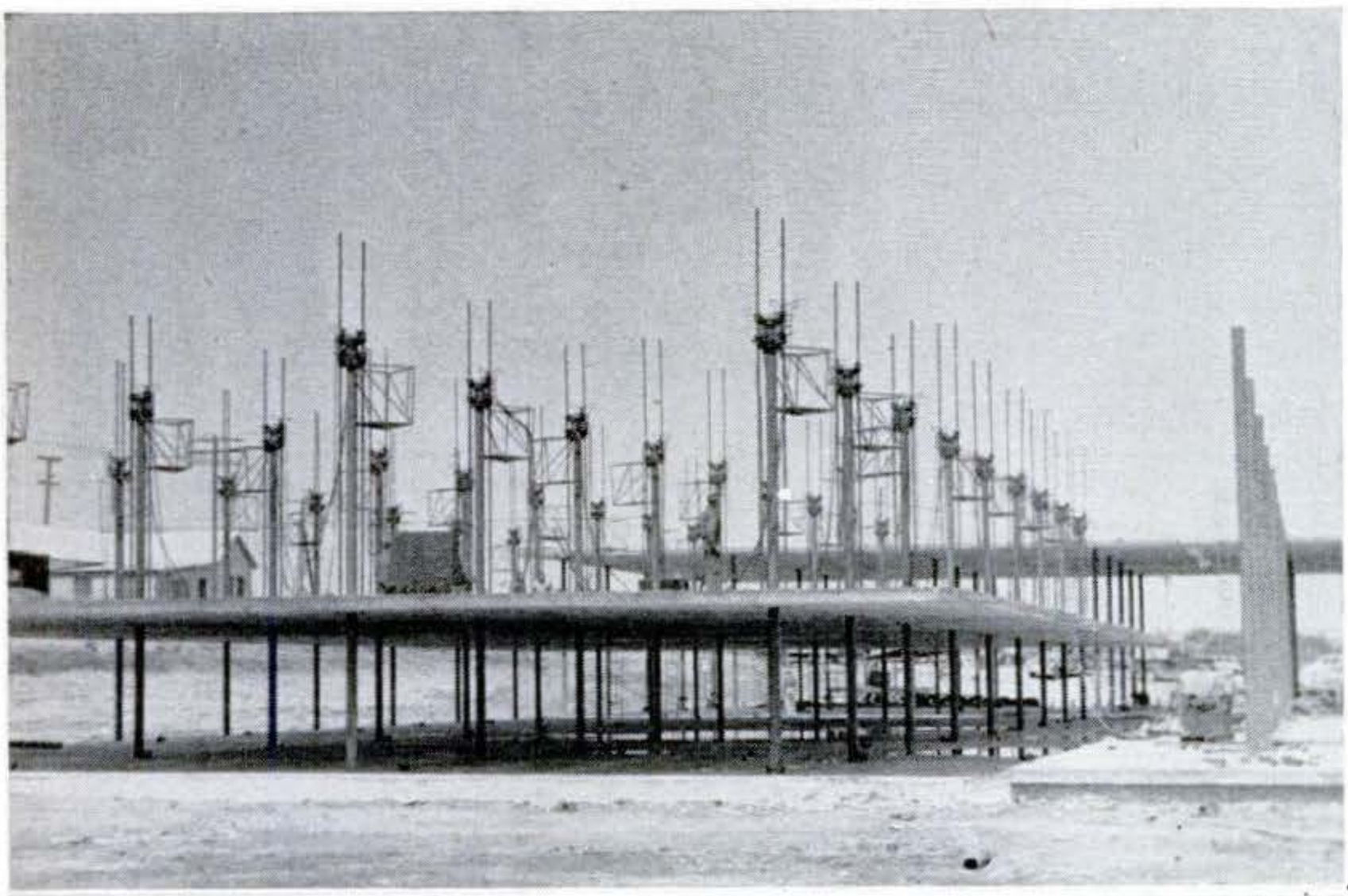
Copyrighted material

# This Building Is Just a Stack of Flapjacks

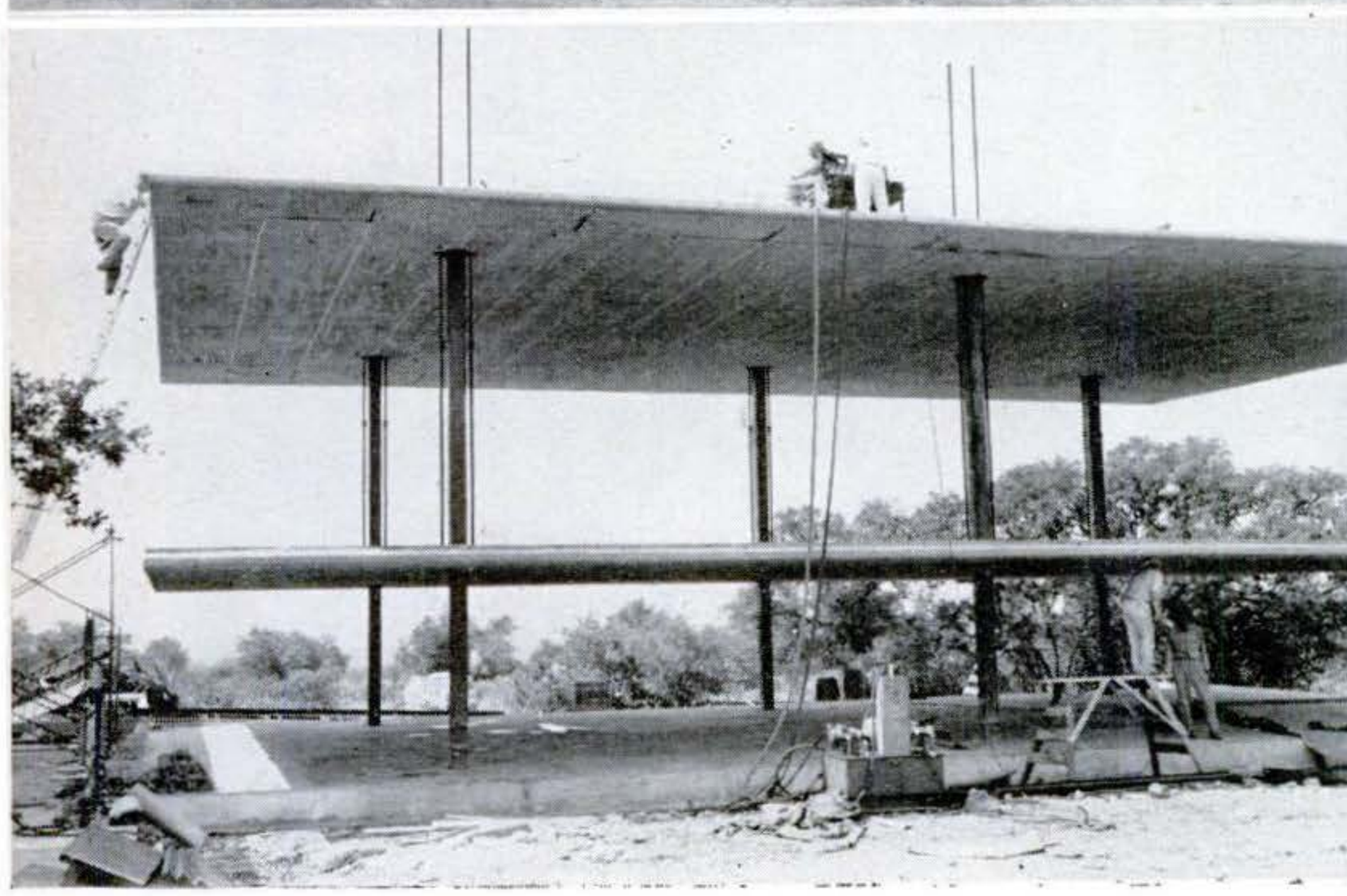
THE big concrete-and-glass building at left is a stack of flapjacks—made of concrete. The way it was constructed may revolutionize building methods for structures as high as six stories.

Big "pancakes" of concrete were poured at ground level and inched up into position by hydraulic jacks to form the roof and second floor. This is known as the Youtz-Slick lift-slab method.

## then two are jacked up as roof and second floor.



**3 ROOF IS POURED now and the jacks are mounted on columns to hoist it into place. Slabs are raised two inches at a time. Each jack can lift 100,000 pounds and is accurate to 1/16 inch. Yet jack needs only a 10-horsepower electric motor to maintain pressure in hydraulic lines. Rate of lift is about four feet an hour. Collars are welded into place when slab reaches proper height.**



**4 SECOND FLOOR is going up. Tiny figure on roof is jack operator, who raises slab and himself by "playing" control console. Once roof and intermediate floors are in position, workmen complete building by adding non-weight-carrying walls and partitions. At Trinity University, engineers poured 14 separate slabs in forming second floor and roof of building 384 feet long, 61 feet wide.**



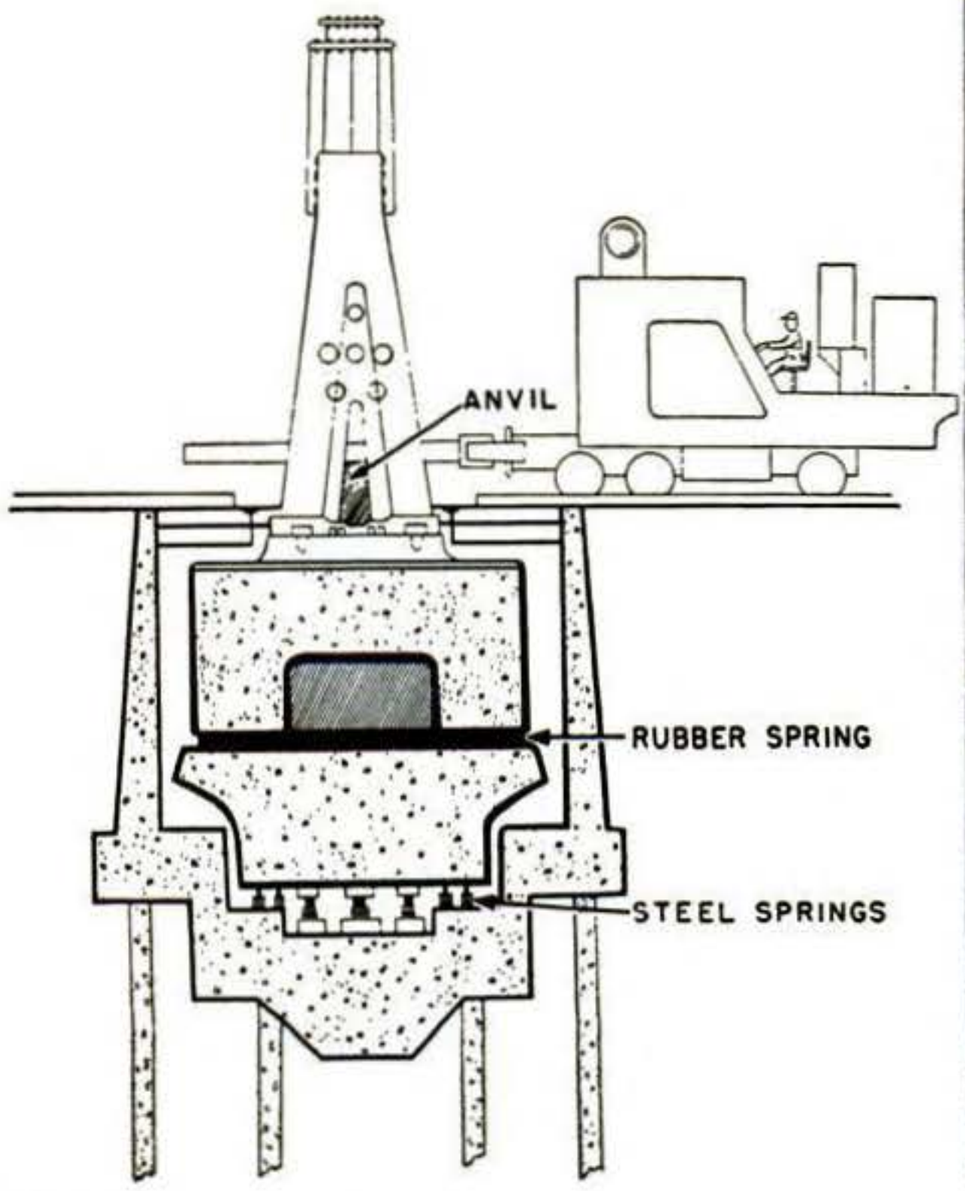
Copyrighted material

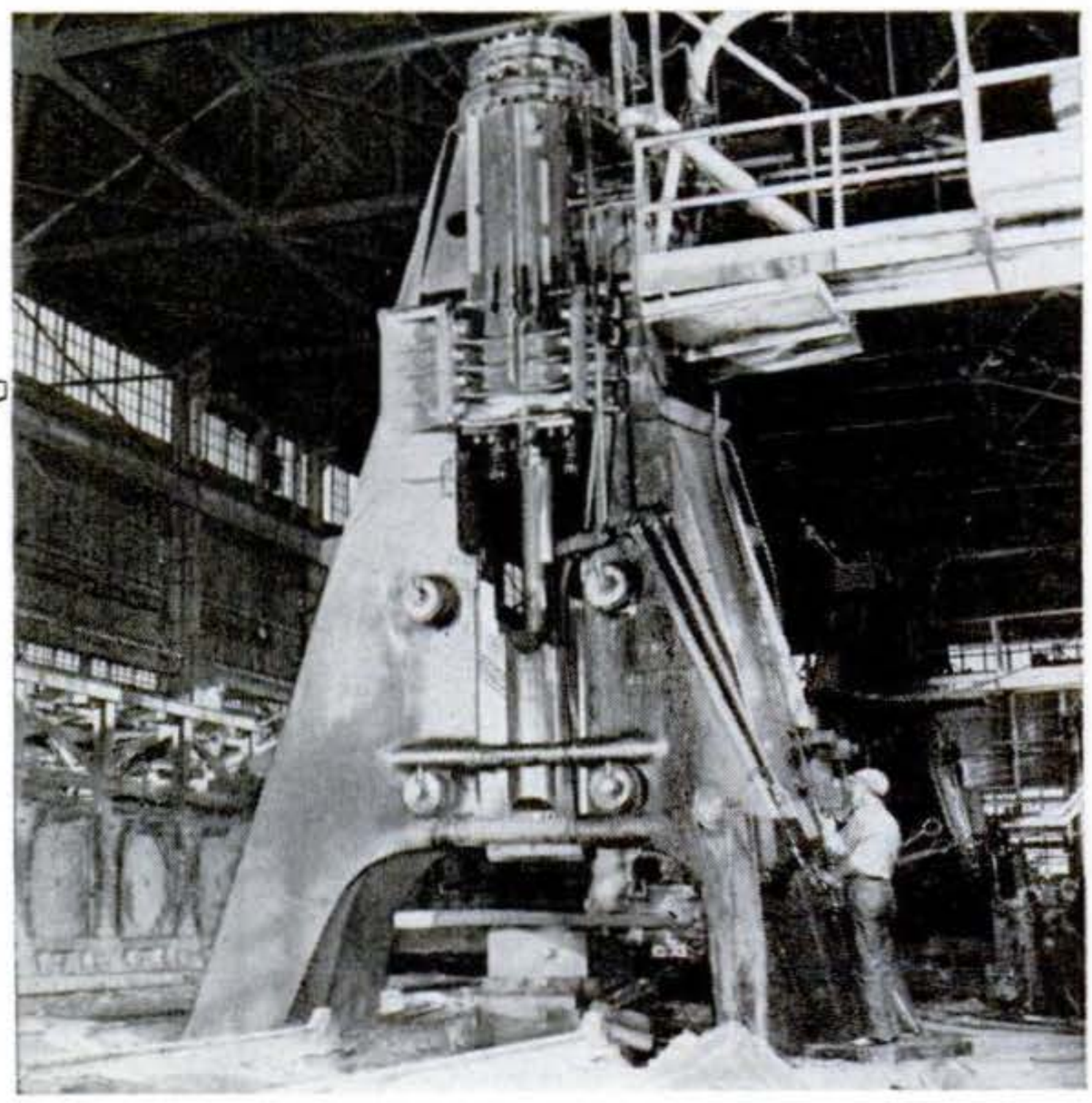
## Rail-Riding Jeep Replaces Handcar, Travels Highway, Too

A SOFTER life for railroad section gangs and inspection men is assured by the new kind of jeep pictured above. The men ride in a snug caboose. Flanged guide wheels front and rear, which are raised and lowered hydraulically, keep the rubber tires on the track until the driver finds it convenient to take to a nearby highway.

## Three-Story Mechanical Blacksmith Rests on Spring Bed

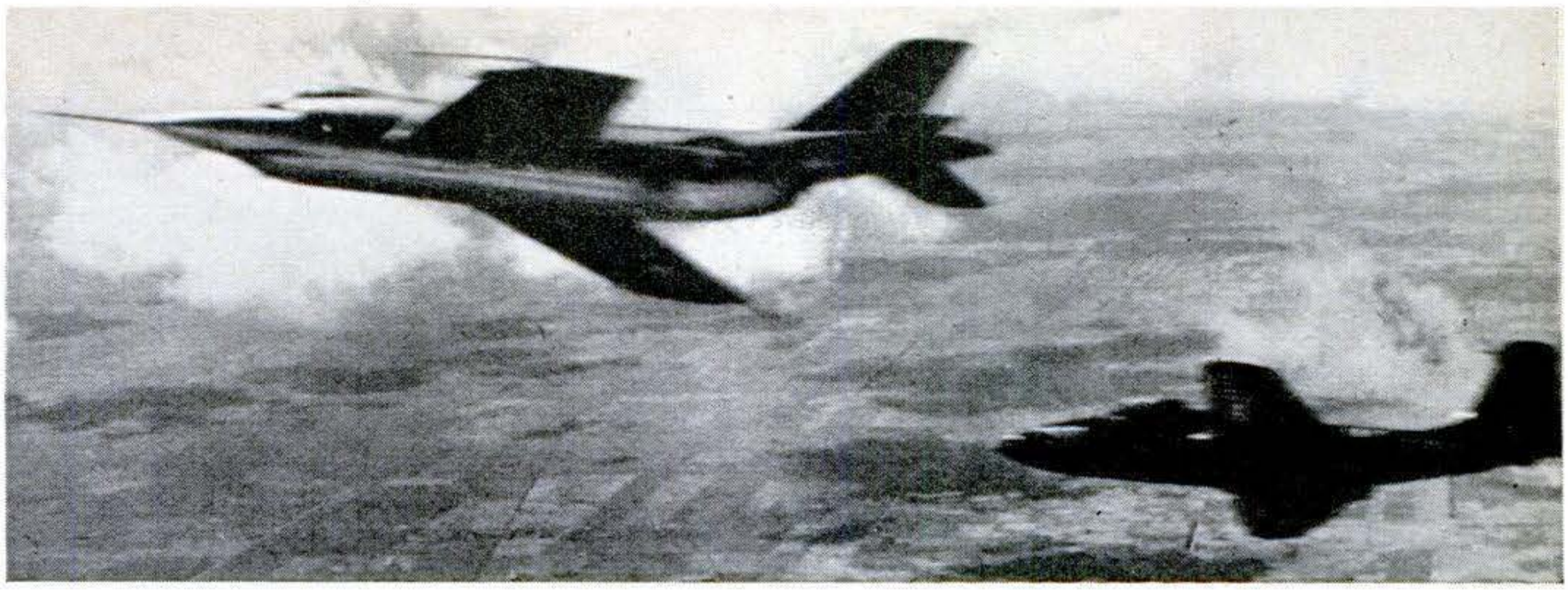
THE hefty steam-operated hammer shown below used to send damaging quivers through a 90-acre factory in Huntington, W. Va., with mighty poundings backed by 5,000 pounds' pressure. Now it forges huge nickel-alloy ingots without disturbing a single nearby windowpane. That's because it literally floats on a pair of concrete rafts supported, as the drawing at left shows, by both rubber and steel springs. The latter, 432 of them, are coil springs somewhat like those in a railroad car.



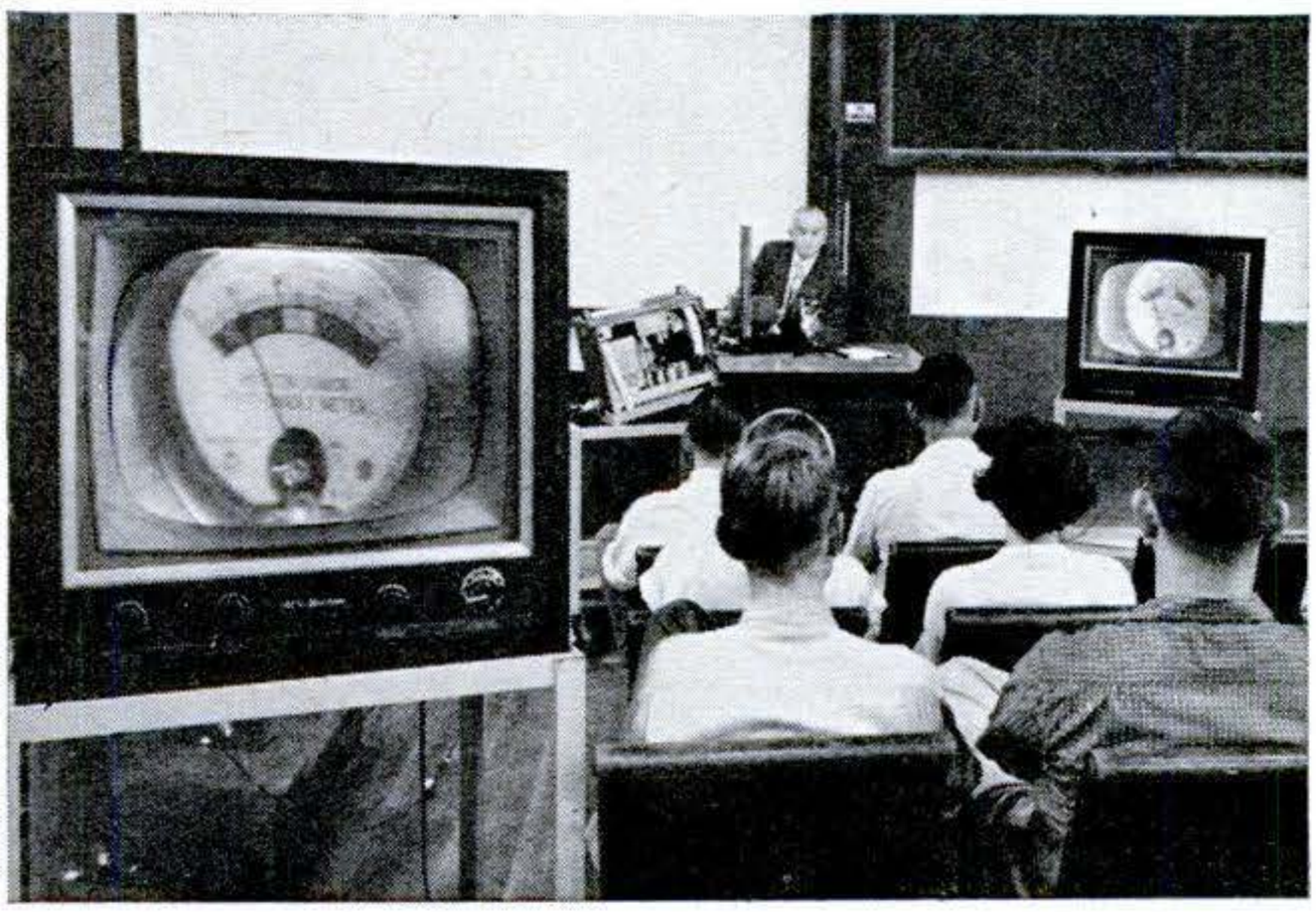


Copyrighted material



## Banshee Chases Demon in Test of New Navy Jet

LIKE a fledgling followed by mama, the XF3H-1 Demon (left)—newest Navy jet fighter—tries its wings escorted by an old hand. A Banshee chases after the single-jet, swept-wing experimental fighter, sticking close to make flight observations. The two pilots keep radio contact, a camera in the chase plane films maneuvers. Both planes are made by McDonnell. Banshee tops 600 m.p.h., Demon's speed is still secret.



## Classroom TV Shows Science Experiments

TV is working its way through college. At Cornell, a midget camera is helping students get a good view of what's going on in physics classes. Phenomena invisible to the naked eye are photographed through a microscope and flashed on two RCA screens that can be seen anywhere in the room. The setup is also used (left) to let the whole class see small objects like meters.

## Tiny Wire Recorder Fits in Your Hand

SMALL enough to be spanned by a woman's hand, this German wire recorder weighs only two pounds. It runs on four batteries (two in parallel power a nine-volt motor) and holds enough wire to record for 2½ hours. One of its two microphones is shown worn on the wrist. There is also a headset for playing back and a spare reel of wire. The Minifon is made by Monske and Co. of Hanover, and sells for 680 marks, about $156.

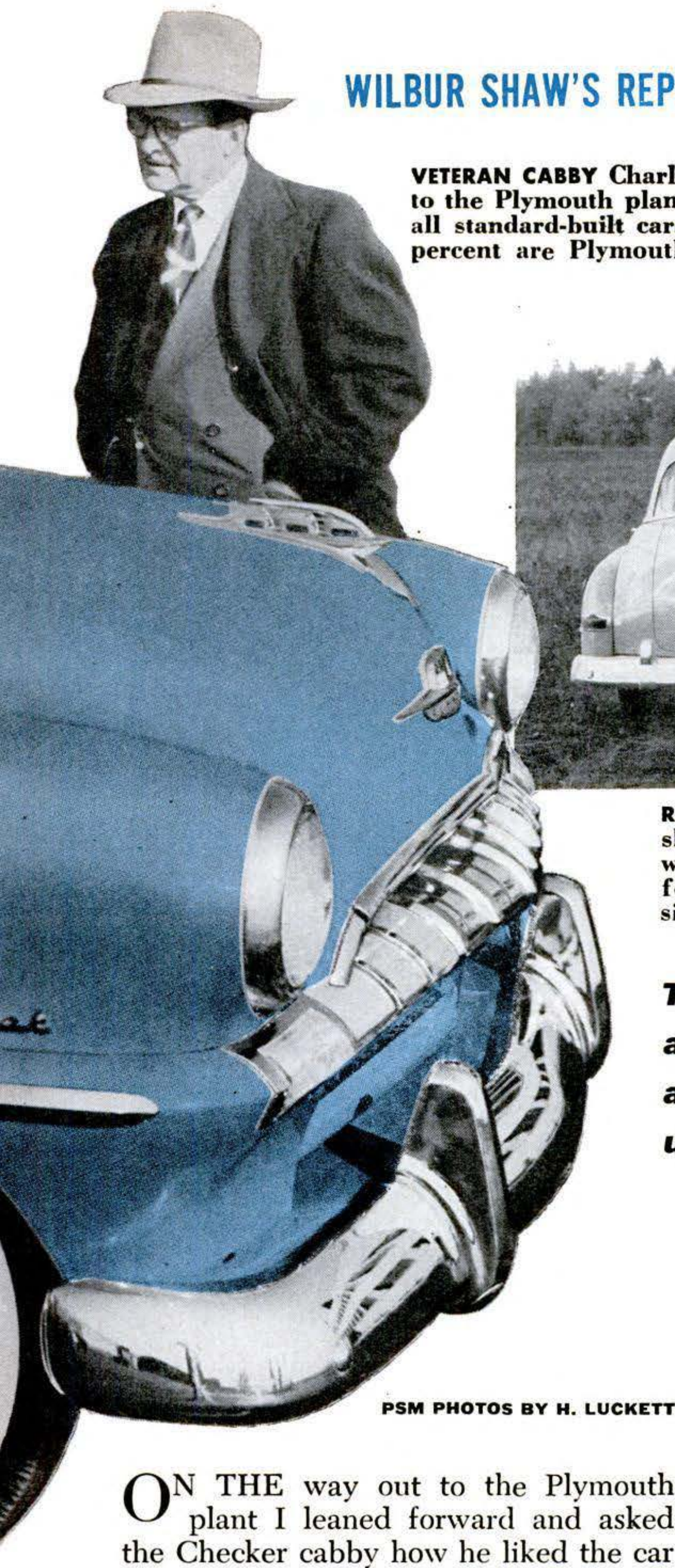
Copyrighted material

# 1953 Plymouth Smooths Rough Roads



Copyrighted material

# WILBUR SHAW'S REPORT FROM THE DRIVER'S SEAT



**VETERAN CABBY** Charles Truesdale, who drove me out to the Plymouth plant, looks over the '53 model. Of all standard-built cars registered as taxis in U.S., 57 percent are Plymouths. Charlie drives one himself.

**REAR-VIEW COMPARISON** of '52 and '53 models shows how new car (right) has been given lower, wider look by restyling window, deck lid and fenders. That's Bob Steere, Plymouth's young assistant chief engineer, with me in background.

PSM PHOTOS BY H. LUCKETT

***There's a new front suspension, axles are moved in closer together and weight farther out—all adding up to a remarkable ride.***

ON THE way out to the Plymouth plant I leaned forward and asked the Checker cabby how he liked the car he was driving. It was a '52 Plymouth.

"Mister," he said over his shoulder, "we put 100,000 miles on these babies in one year. I push this hack daytimes and another guy takes it nights. She runs good and there's not always some little thing breaking down . . ."

Would he care to take a gander at the '53? He would. And when we got to the plant he did. He liked that one, too. In fact, I could see he was itching to get his hands on a '53 Plymouth cab.

To tell you the truth I was a little surprised when I got my first look at the new Plymouth. I've always liked this sturdy, conservative car. But here was something I hadn't expected—brand-new body lines that caught the eye like a dollar steak on a restaurant menu.

Beside me, Newt Hadley, Plymouth's chief engineer, waited for my reaction.

"Mighty smart looking car," I said.

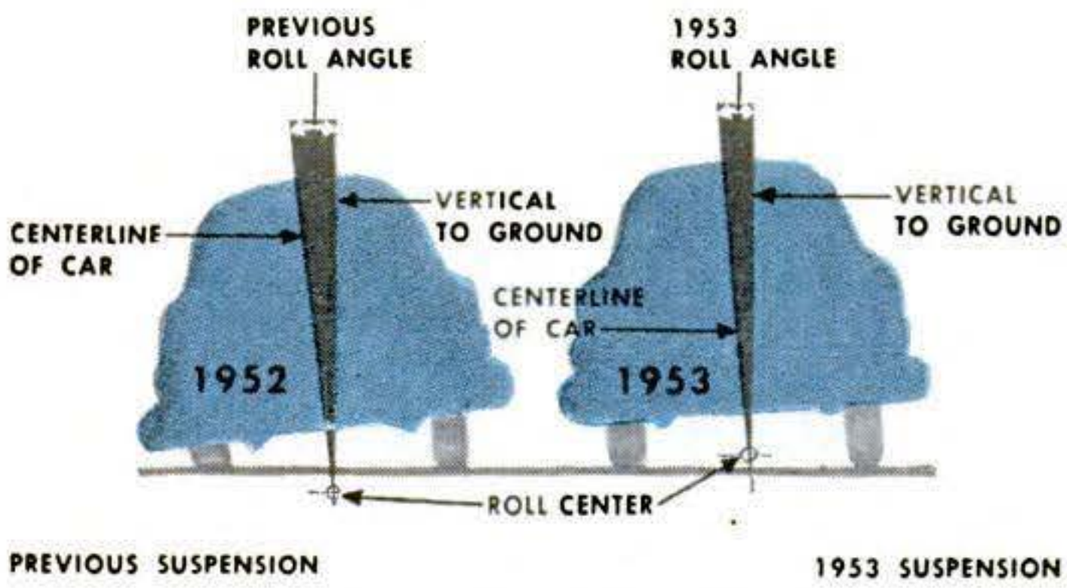
"*We're* kind of pleased with it," Hadley grinned. "But that's only half the story . . . I want you to pick the roughest road you find and give it a workout."

I did just that. I know a stretch of



Copyrighted material

blacktop outside Detroit that I wouldn't wish on my worst enemy in a Rolls. I took that shiny sedan out there and poured it on. When I looked at the speedometer and read close to 65 on a surface where some cars would be hard to control at 40, I was convinced there was news at Plymouth for '53.




**Comparative effect of roll on car.**

When I got back I had a session with Hadley and assistant chief engineer Bob Steere. Here's the meat of the story:

In addition to the desired forward movement of an automobile, there are three kinds of motion you *don't* want—pitch, roll and bounce. That is—rocking from front to rear, sidesway in taking a turn, and motion up and down. This year Plymouth has tackled all three at once.

To reduce pitch the rear axle has been moved forward. That's right—the wheelbase is shorter. We've always been led to believe that a long wheelbase is essential to a good ride. That's one way to do it. But Hadley and Steere say that it's not the only way. The sketches on this page show how they explained it to me.

The point where the top suspension arms are attached to the frame has been lowered one-half inch, to give a non-parallel front-suspension linkage. This has raised the roll center—lessened the car's *tendency* to roll on turns. *Resistance* to roll has been increased by splaying the rear springs and using wider leaves.

Oriflow shock absorbers take care of the bouncing. I was enthusiastic about these shocks when I first told you about them (PSM, Feb. '51, p. 98). Plymouth claims they're even better now.

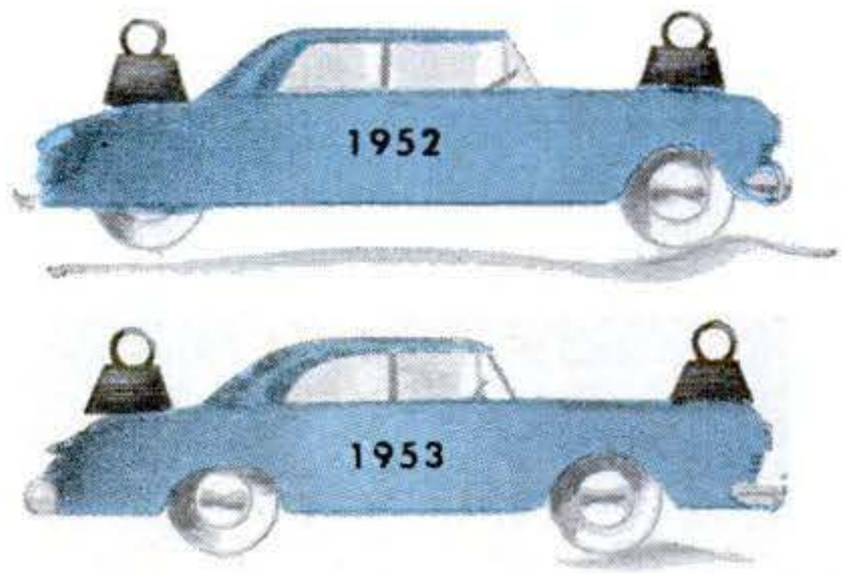
The car's speed and pickup are not exceptional, though there is no cause for complaint on that score. Only a few minor changes have been made this year in the power plant, but it does seem a bit livelier. Bob Steere has an answer to that: "By cutting an ounce here and an ounce there we've reduced car weight between 50 and 60 pounds. That improves performance as effectively as if we increased the piston displacement."

The zero-to-60 reading I got on the car I tested was 15.7 seconds. This car won't win any drag races, but that's respectable acceleration in any man's league.

Most of the new features are brought out in the photographs but there are a couple I want to mention here.

The car looks a lot lower. That's mainly an optical illusion (it's less than an inch, actually). The eye is fooled by a lower belt line combined with higher fenders and rear deck, and a roof that

**EVENLY DIVIDED WEIGHT resting far out from a single load-bearing point would result in minimum "seesawing," or pitch.**

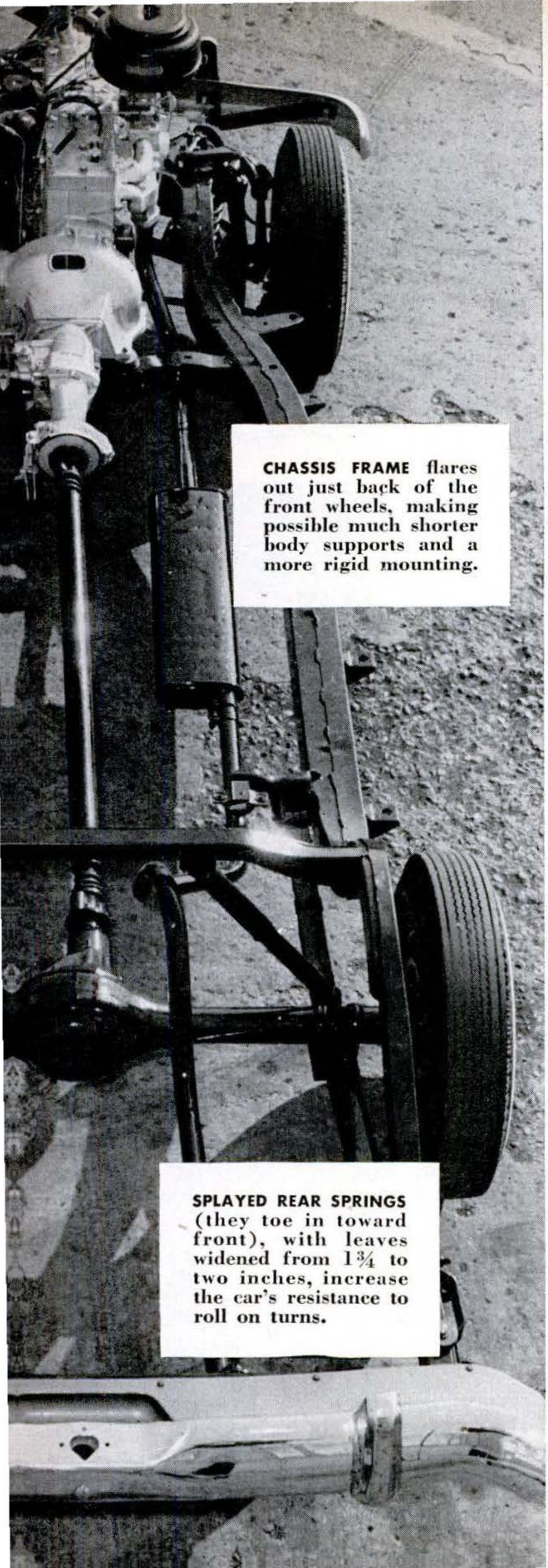



**IN '53 MODEL, Plymouth has more nearly approached this imaginary ideal by moving the axles closer together and weight farther out.**

slopes down at the front with a sort of visored effect. This last point I didn't care too much for—it might reduce visibility for a tall driver. But the long-legged motorist gets a break in another way—the shift lever has been moved from the side to the top of the steering column, which means more knee room for a big guy. Hubert Luckett, PSM's six-foot three-inch staff photographer, was along to shoot the pix—and it was Lucky who spotted that one.

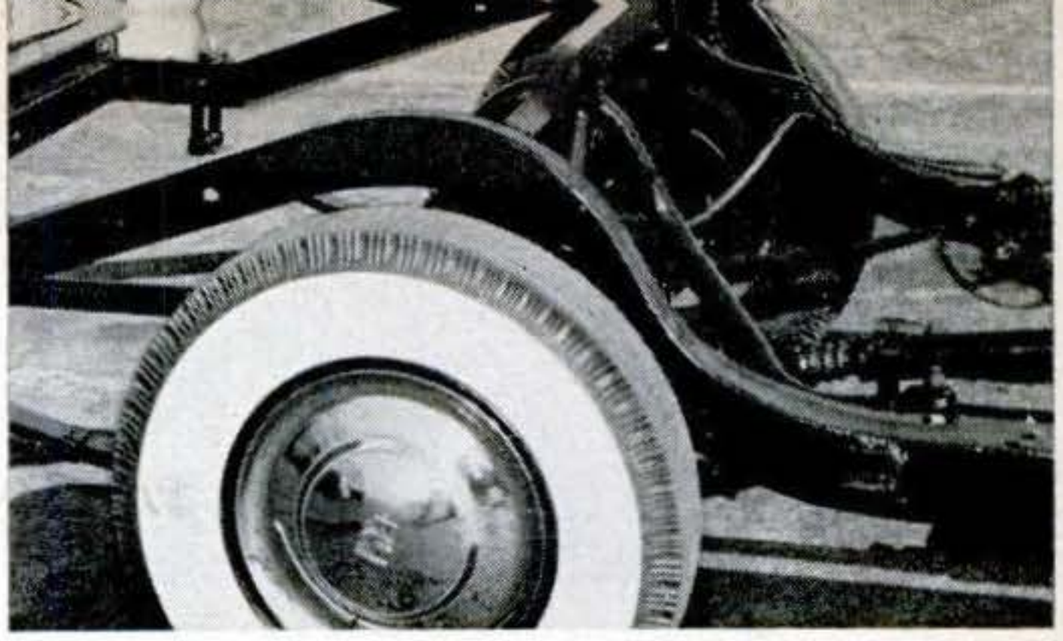


Copyrighted material



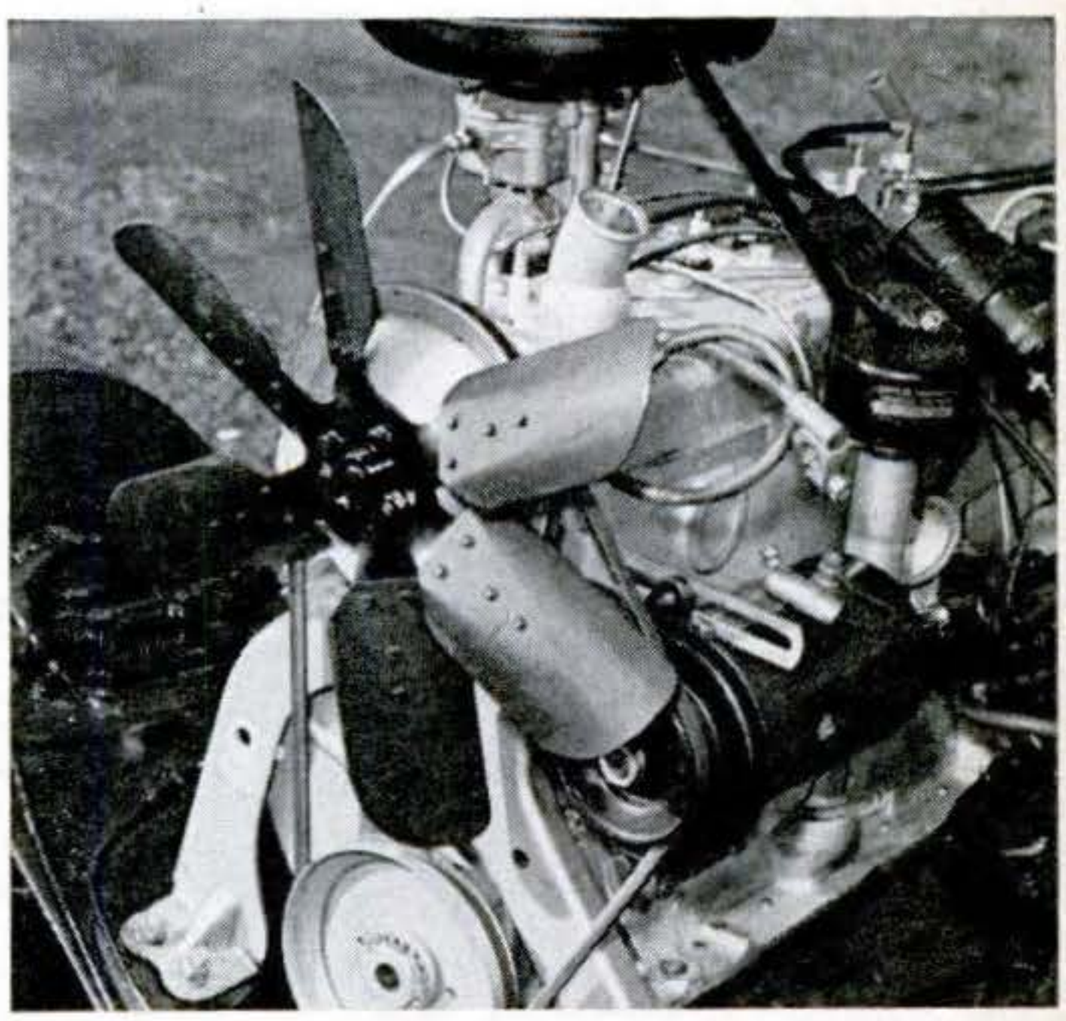
**CHASSIS FRAME** flares out just back of the front wheels, making possible much shorter body supports and a more rigid mounting.

**SPLAYED REAR SPRINGS** (they toe in toward front), with leaves widened from 1¾ to two inches, increase the car's resistance to roll on turns.



**ABRUPT KICKUP** of frame lets rear seat back up closer to wheel housing. This, plus fact engine is 2½ inches farther forward, makes car roomier even with rear axle moved up.

**I WAS PARTICULARLY PLEASED** by elimination of useless air space in front of engine. With today's compact power plants it's time we got rid of those long, view-obstructing hoods.

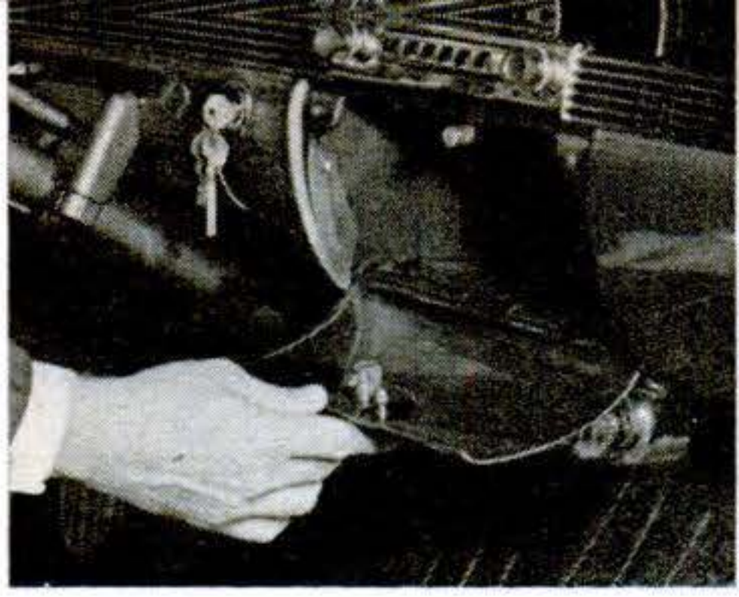


**HERE'S A CLOSE-UP** of the new six-bladed fan. A bigger fan pulley slows it to less than engine speed, cuts noise. Blades are spaced unevenly to avoid setting up resonant vibration.

*Please turn the page for more Plymouth photos.*



Copyrighted material



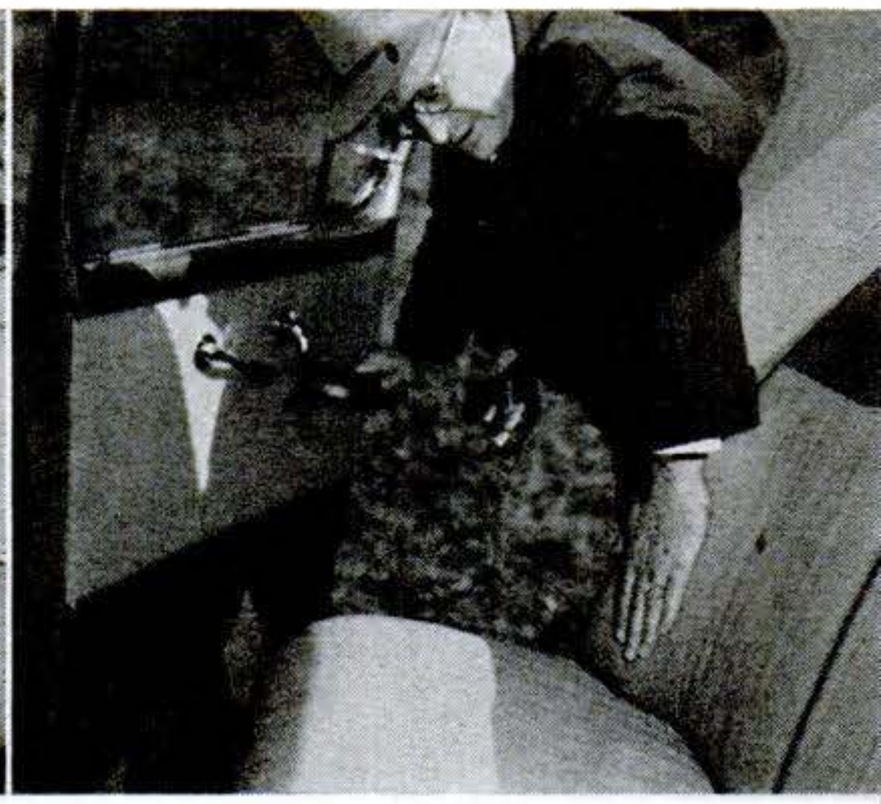
**REDESIGNED INSTRUMENT PANEL** has the glove compartment in the center for the convenience of the driver—as well as his wife. Ash tray is now just to right of steering column. I liked the absence of sharp projections on the dash—they can be dangerous in case of a crash or sudden stop.

**TRUNK SPACE** is 30 percent bigger. Hinges are at sides, out of the way. I don't know about you but I'm tired of having my bags mashed by trunk hinges. Moving axle forward lessens wheel-housing bulge in trunk. Lid is wider, deck top squared off, gas tank flattened to lower trunk floor.

**NEW ONE-PIECE WINDSHIELD** has an almost uniform curve that holds distortion to a minimum. I detected just a little at the upper corners. Electric wipers now park toward center for a better sweep on curved windshield. Tinted safety glass is available for entire window area—at extra cost.

**THIS PICTURE ILLUSTRATES** something I feel rather strongly about—there's too much chrome gingerbread tacked onto most cars for my taste. This year Plymouth has built the "character lines" right onto the car to point up its contours. But you can get extra chrome if you want it.

**THEY'VE PULLED A NEAT TRICK** here. In all two-door models the front seat is divided two-thirds on the driver's side, one-third on the other. This young lady, Janet Menard of Plymouth's Planning Dept., showed me how easily she could slide over to let a passenger into the rear seat.



**IT'S EASIER TO GET IN AND OUT** of rear seat in four-door model now that the armrest has been shifted to door. Back-seat cushion has hip-hugging curve. Door frame is cut back at top for better visibility. The tough plastic door panels should be a boon to fathers of young cowboys.

## FACTS ON '53 PLYMOUTH

**Model:** Cranbrook four-door sedan.

**Engine:** 6-cyl. L-head; 100 hp. at 3,600 r.p.m.; compression ratio, 7.1:1; piston displacement, 217.8 cu. in.; piston travel (in feet per car mile at 20 m.p.h.), 2,040; bore and stroke, 3¼" by 4⅜"; crankshaft bearing surface, 40.6 sq. in.; torque, 177 lb.-ft. at 1,200 r.p.m.

**Weight:** 3,170 lb. (approx.); per hp., 31.7 lb.

**Transmission:** 3-speed manual shift (overdrive available). Rear-axle ratio, 3.73:1 (standard); 4.1:1 (overdrive).

**Steering ratio:** 21.1:1.

**Radius of turning circle:** 19½'.

**Effective brake-lining area:** 158 sq. in.

**Springs:** front, coil; rear, semi-elliptic.

**Outside dimensions:** height, 62¼"; overall length with bumpers and guards, 189⅛"; width, 73⅞"; wheelbase, 114"; overhang, front 30⅜", rear 44¾"; tread, front 55⅞", rear 58½".

**Inside dimensions:** seat-cushion width, front 59¾", rear 58¾"; leg room, front 44⅛", rear 42¼"; headroom, front 36⅝", rear 35⅛"; seat height, front 14¼", rear 15⅛"; front-seat adjustment, horizontal 5", vertical 1⅛".

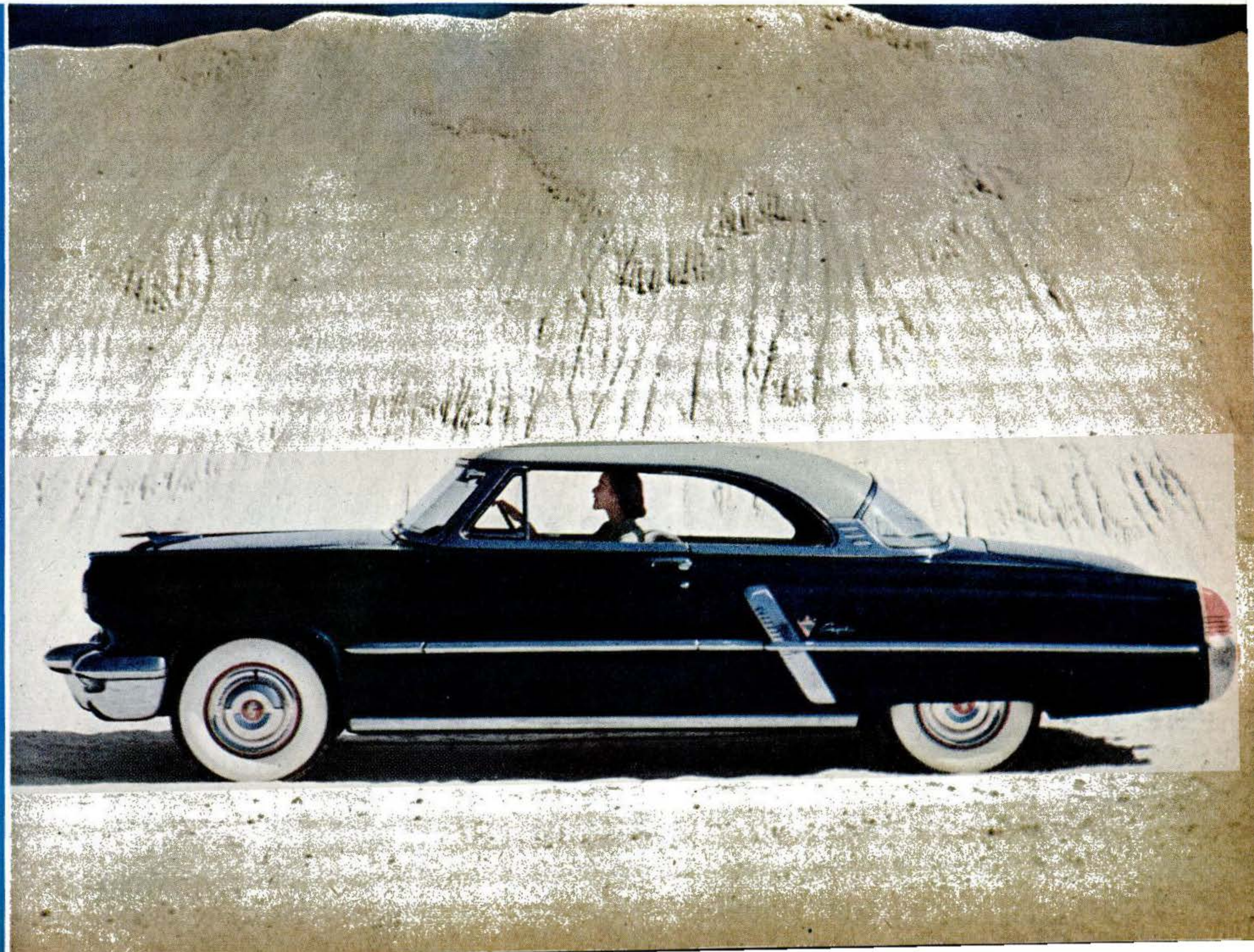
**Tire size:** 6.70 by 15.



Copyrighted material

# 1953 Lincoln Powered by 205-Hp. Engine

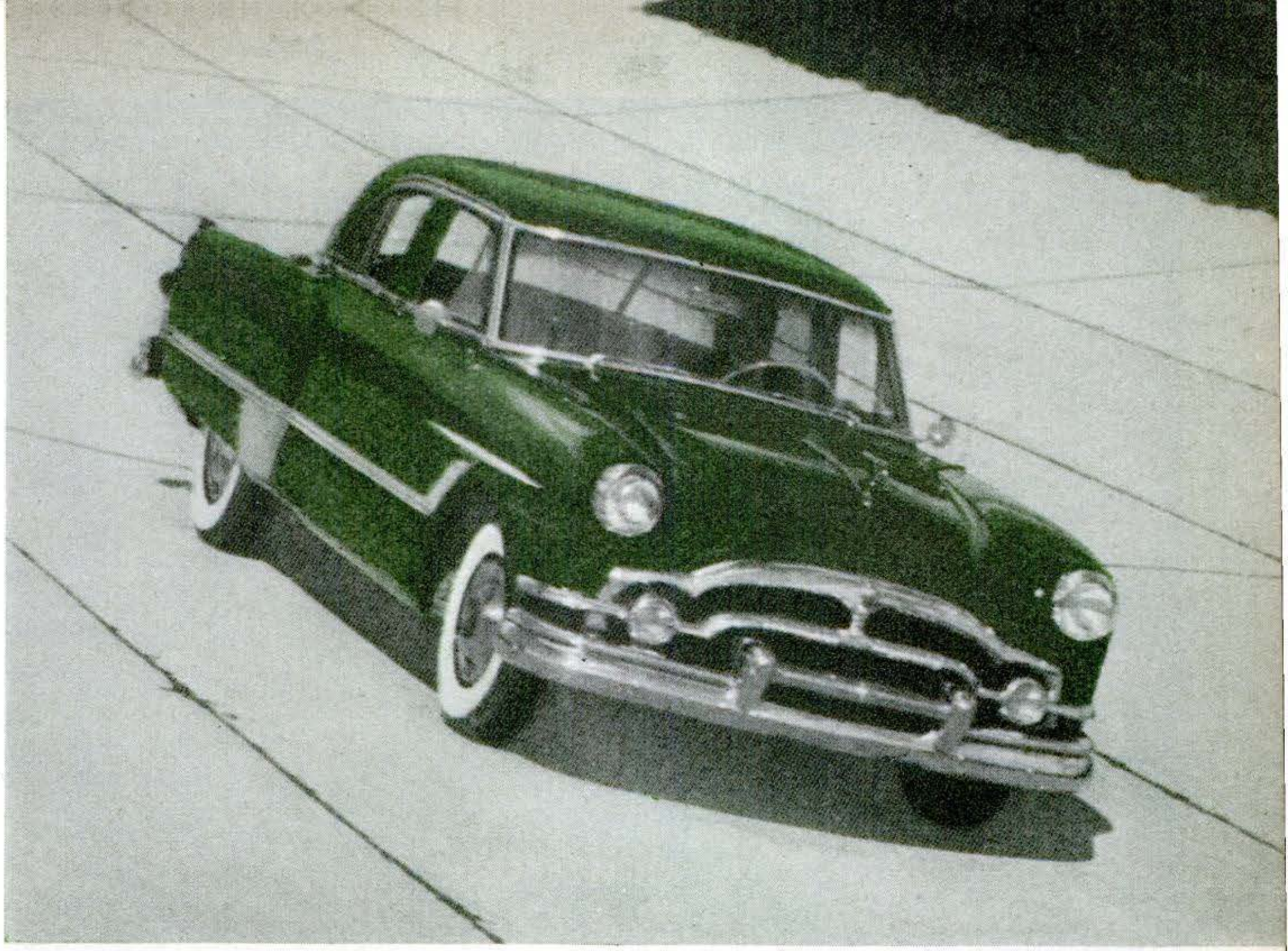
TOUCH a button on the 1953 Lincoln and—presto!—the front seat moves forward, backward or up or down without any effort on your part at all. The Lincoln's power-adjusted seat is a tipoff that the car has power to spare—it's the most powerful stock car on the American road. The boost from 154 hp. in 1952 to 205 in '53 is the biggest Detroit has ever witnessed. The car accelerates from zero to 80 m.p.h. in 23 seconds and has a top speed of 112. Among the refinements on the overhead-valve V-8 engine is a new four-barrel carburetor, better manifolding and an exhaust system reducing back pressure. Power steering and power brakes are optional.



# 1953 DeSoto Goes European in Styling

LIKE the other members of the 1953 Chrysler family, the new DeSoto has a brand-new body, with a one-piece windshield and a wrap-around rear window. A lower silhouette and longer fender lines give the car an appearance of European styling. Mechanically, the DeSoto retains the 160-horsepower V-8 engine introduced in 1952, but continues to offer the six also. A new, squattier carburetor permits a lower hood. A wider frame reduces sidesway, as do rear springs that are "splayed" by toeing in their front anchorages. DeSoto has gone all-out on optional equipment – power steering, power brakes, automatic drive and electric window lifts are all available.

Copyrighted material



**I LIKE THE NEW GRILLE,** far superior to 1952's. Note how the top band of chrome suggests the original Packard radiator design. This "headstone" has been retained since 1903.

**WILBUR SHAW REPORTS FROM THE DRIVER'S SEAT:**

# 1953 Packard Boasts Simplest Power Steering

POWER steering and power braking are two of the most intelligent improvements to make in an automobile. Packard now has made them both. It introduced toe-tip braking in its '52 models. It is coming up with fingertip steering for 1953.

Packard is the first of the independents to make power steering available to its buyers (for around $190 extra), and the first of all passenger-car builders to use a type of power steering called direct-acting. This type applies the power directly to the steering linkage. It is simple in design and easy to service. There's no clutter of apparatus, as Packard engineers refer to it, on the steering shaft, where both GM and Chrysler have put their power-steering devices.

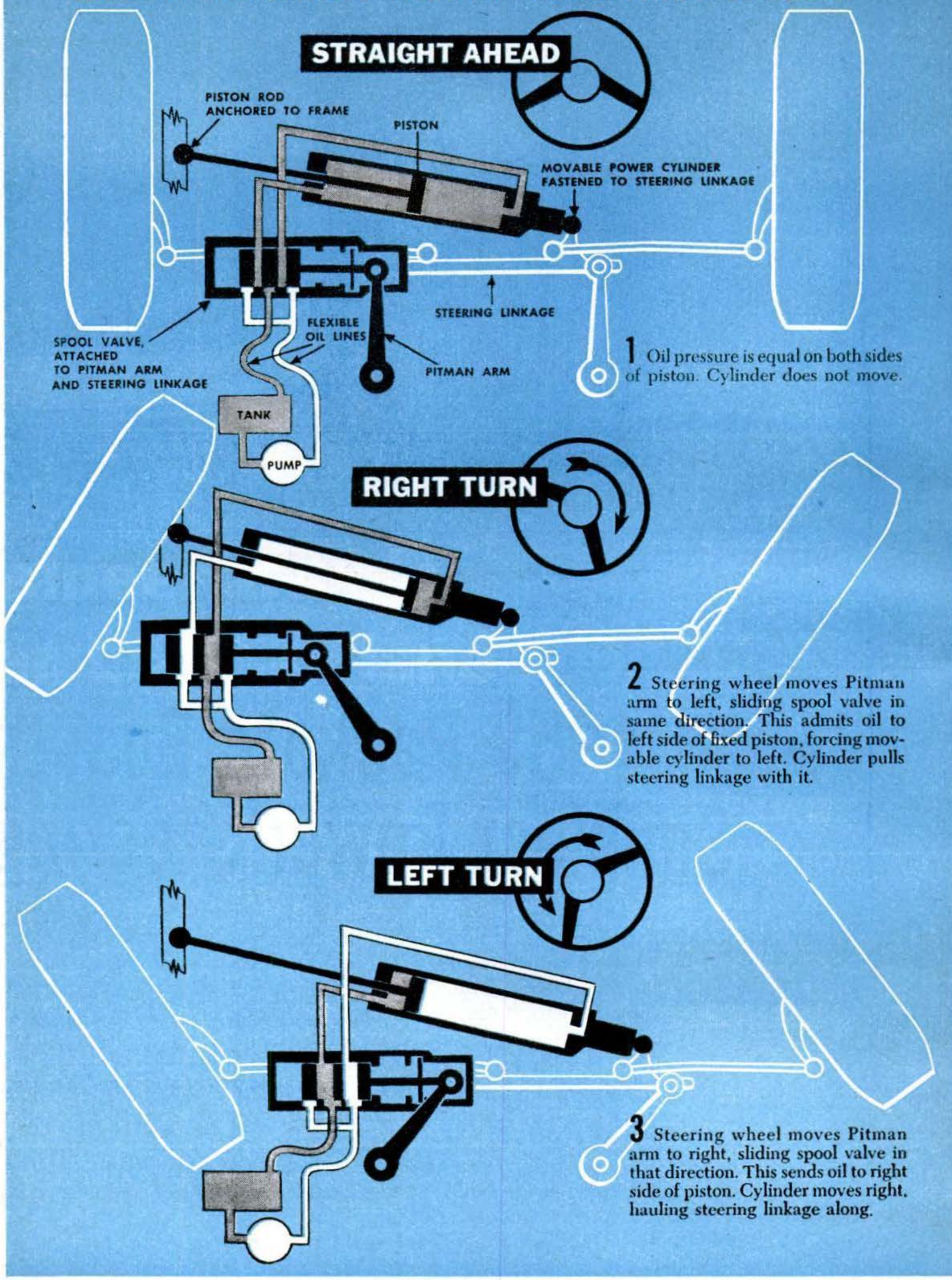
I tried out Packard's power steering on a 1953 Patrician 400, a four-door sedan of the company's largest and most expensive line.

The remarkable stability of the front end, even with the effortless steering, was immediately apparent and was still firmly evident at 102 miles an hour, which was as fast as I seemed to be able to



Copyrighted material

# HOW PACKARD'S POWER STEERING WORKS



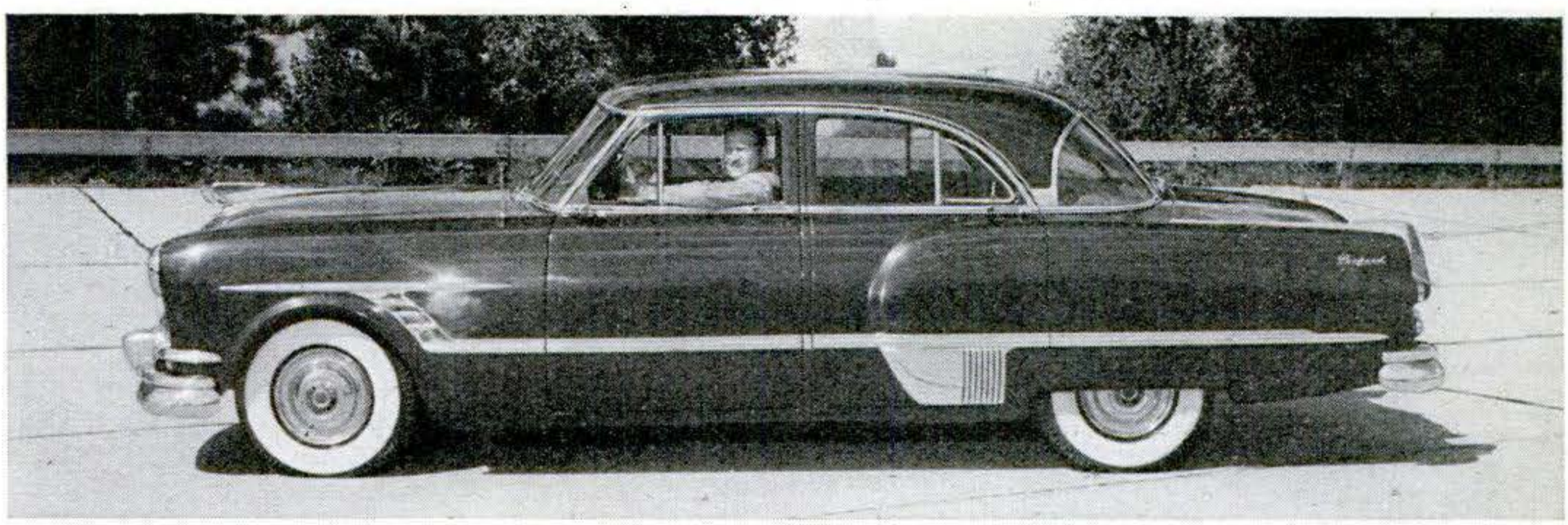

**1** Oil pressure is equal on both sides of piston. Cylinder does not move.

**2** Steering wheel moves Pitman arm to left, sliding spool valve in same direction. This admits oil to left side of fixed piston, forcing movable cylinder to left. Cylinder pulls steering linkage with it.

**3** Steering wheel moves Pitman arm to right, sliding spool valve in that direction. This sends oil to right side of piston. Cylinder moves right, hauling steering linkage along.



Copyrighted material



**LOWERED CHROME MOLDING makes the 1953 Patrician look closer to the ground. I'm glad the designers got rid of those rear-fender vents some people called "bottle openers."**

make the car go. The Patrician handled easily, but there was no looseness about the feel. I was reminded again of the old saying that you don't have to steer a Packard; you just point it.

The engines of Packard's three lines have also been hopped up an extra 10 to 20 horsepower for 1953. Everybody's doing it now, one way or another. Packard did it by shaving down a protruding hump in the ceiling of the compression chamber and adopting a four-barrel carburetor. This combination allows a greater charge of gasoline and air to go into the engine, improving breathing—and performance.

### *Ambulance Axles Used*

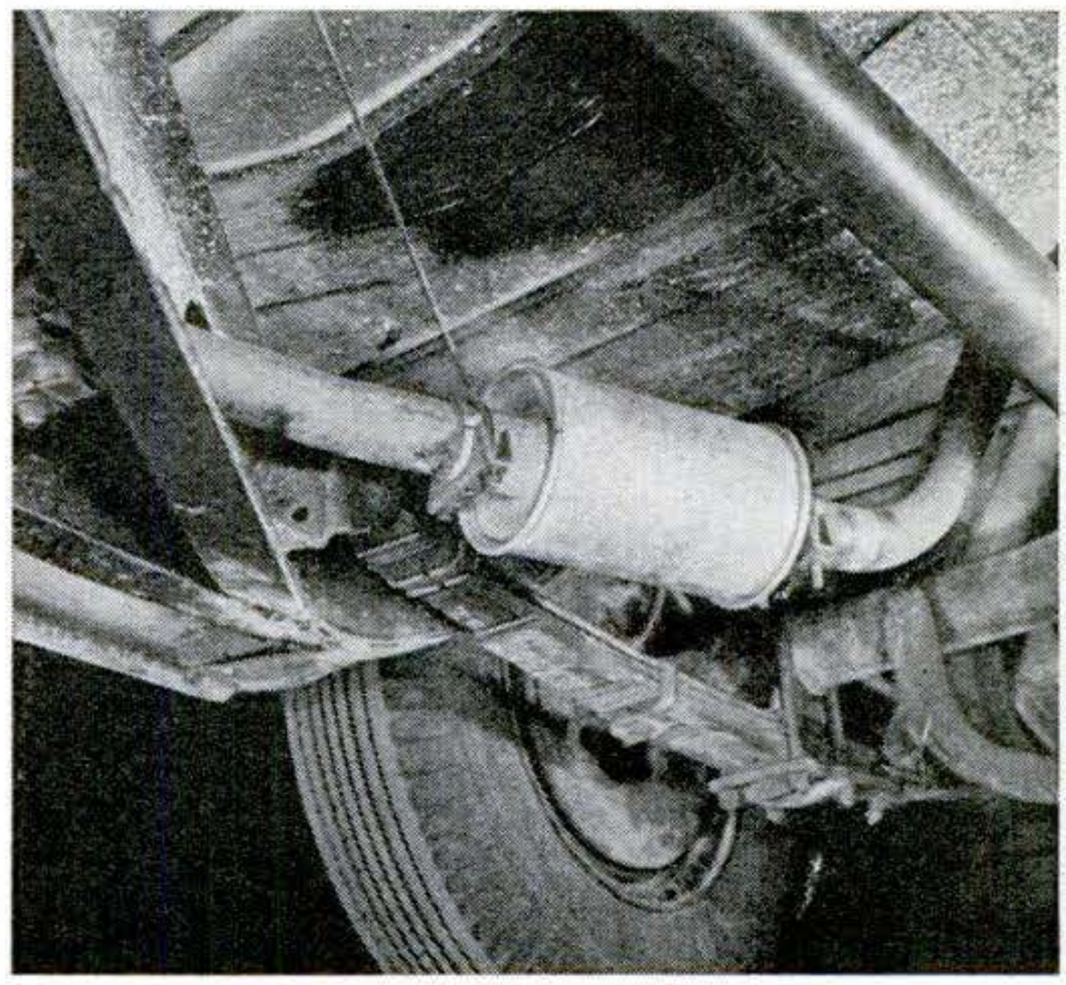
To stand the gaff of these livelier power plants, the 1953 Packards will have sturdier rear axles, strong enough to carry an ambulance. The design of the new axles was actually borrowed from Packard ambulances.

The front end of the running gear in the '53 Packards, except for the steering mechanism, has been insulated from the frame by rubber-cord bushings. This makes a famous soft ride softer still.

Apart from where the apparatus is located, the chief difference between Packard's power steering, on the one hand, and GM's and Chrysler's, on the other, is in the order in which actions take place.

When you turn the steering wheel of any Packard, the movement immediately causes the Pitman arm to turn, and the Pitman arm then moves the steering link-

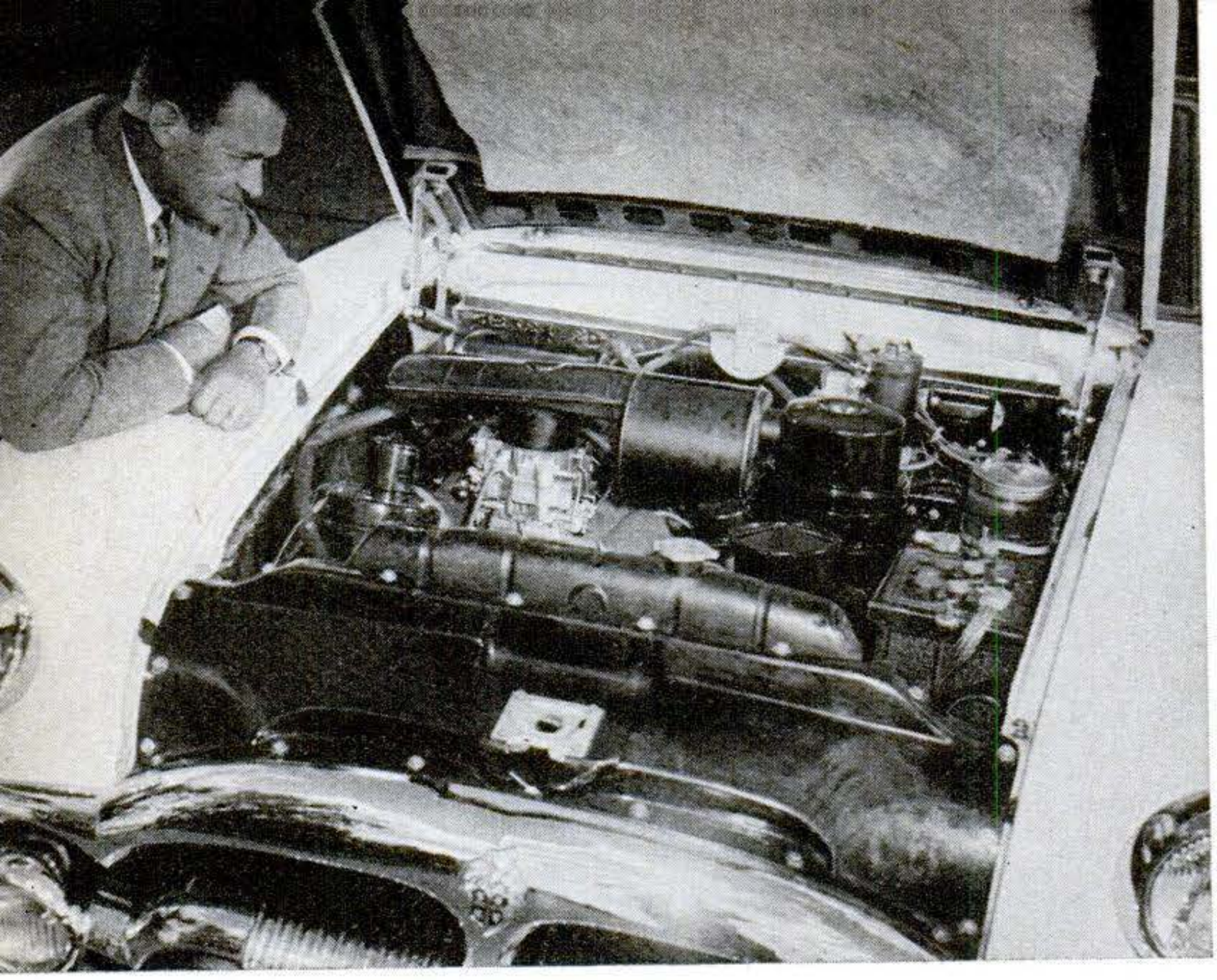
**"IT'S GOT SLIMMER HIPS," I said when I got a good look at the rear of the 1953 Patrician. But I found that design tricks were responsible. It's really as broad and heavy as ever.**



**A RESONATOR HAS BEEN ADDED to the exhaust system. This gadget takes the pulsations out of the sound of a combustion engine's exhaust and gives it the swishing sound of a jet.**



Copyrighted material



**GLASS-FIBER PAD** under the bonnet is new. It is primarily to insulate the paint from engine heat. (One rival manufacturer of luxury cars found that his engines were actually blistering the paint.) But the pad has the additional advantage of deadening engine and body noises.

At left rear you can see Packard's new four-barrel carburetor, partly responsible for the boost in horsepower that the 1953 lines offer.

At right front is the top of the one-quart reservoir that holds oil for the power-steering system. This tank, containing a filter, is right over the pump.

age. This is conventional in automobiles.

When the Packard is equipped with power steering, however, at the same time that the Pitman arm starts to move the steering linkage it also moves a sliding-spool control valve attached to both. This valve instantly sends oil under 650 pounds' pressure to a power cylinder fastened at one end to the steering linkage and at the other to the frame of the car. The piston in this cylinder is fixed, anchored to the frame. Therefore the cylinder itself moves to the left or right, depending on which end is feeling the thrust of the oil pressure, and pulls the steering linkage in the same direction. It gives a powerful boost to the movement begun by the Pitman arm.

Now, in the case of GM's power-steering mechanism and of Chrysler's (PSM, April '51, p. 126), though they differ in detail, the boost is applied to the Pitman arm, which proceeds to move the steering linkage just as it does normally. On their power-steered cars (Cadillac, Buick, Oldsmobile, Chrysler, De Soto), when you turn the steering wheel you trigger the control valve, which directs oil pressure against a movable piston within a fixed cylinder. The movement of the piston assists the me-

[Continued on page 238]

## FACTS ON '53 PACKARD

**Model:** Patrician 400.

**Engine:** straight-8 L-head; 175 hp. at 3,600 r.p.m.; compression ratio, 7.8 to 1; piston displacement, 327 cu. in.; bore and stroke, 3½" by 4¼"; piston travel (in feet per car mile at 20 m.p.h.), 1,795; crankshaft bearing surface, 30.7 sq. in.; torque, 300 lb.-ft. at 2,000 r.p.m.

**Weight:** 4,125 lb.; per hp., 23.6 lb.

**Transmission:** Packard Ultramatic; rear-axle ratio, 3.54:1 with automatic transmission (standard on this model).

**Power steering:** 4 turns lock to lock; radius of turning circle, 21½'.

**Effective brake-lining area:** 208.25 sq. in.

**Springs:** front, coil; rear, leaf.

**Outside dimensions:** height, 62 29/32"; over-all length with bumpers and guards, 218 5/32"; width, 77⅞"; wheelbase, 127"; overhang, front 36 31/32", rear, 54 5/32"; tread, front 60", rear 61 7/32".

**Inside dimensions:** seat-cushion width, front 62¾", rear 62"; leg room, front 43½", rear 48¾"; headroom, front 36", rear 35 3/16"; seat height, front 14", rear 13 27/32"; vertical distance, steering wheel to seat cushion, with seat in mid-position, 6"; front-seat adjustment, horizontal 5", vertical 1".

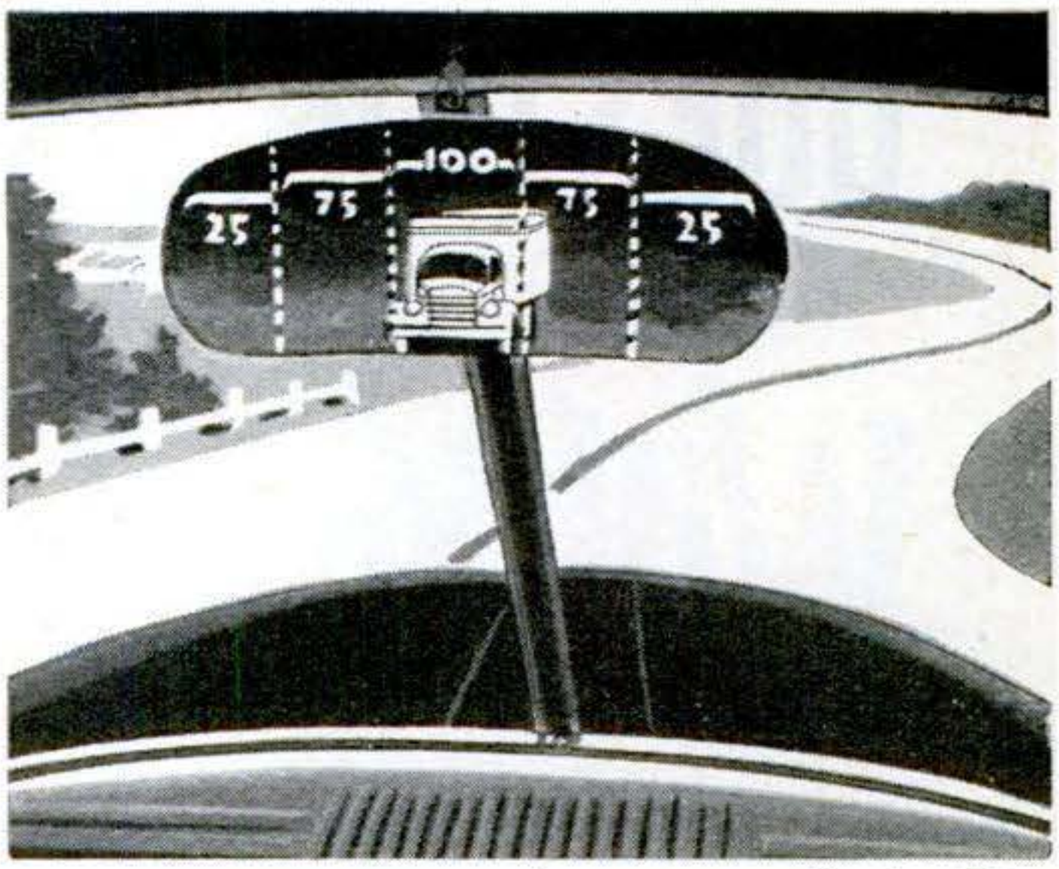
**Tire size:** 8.00 by 15.



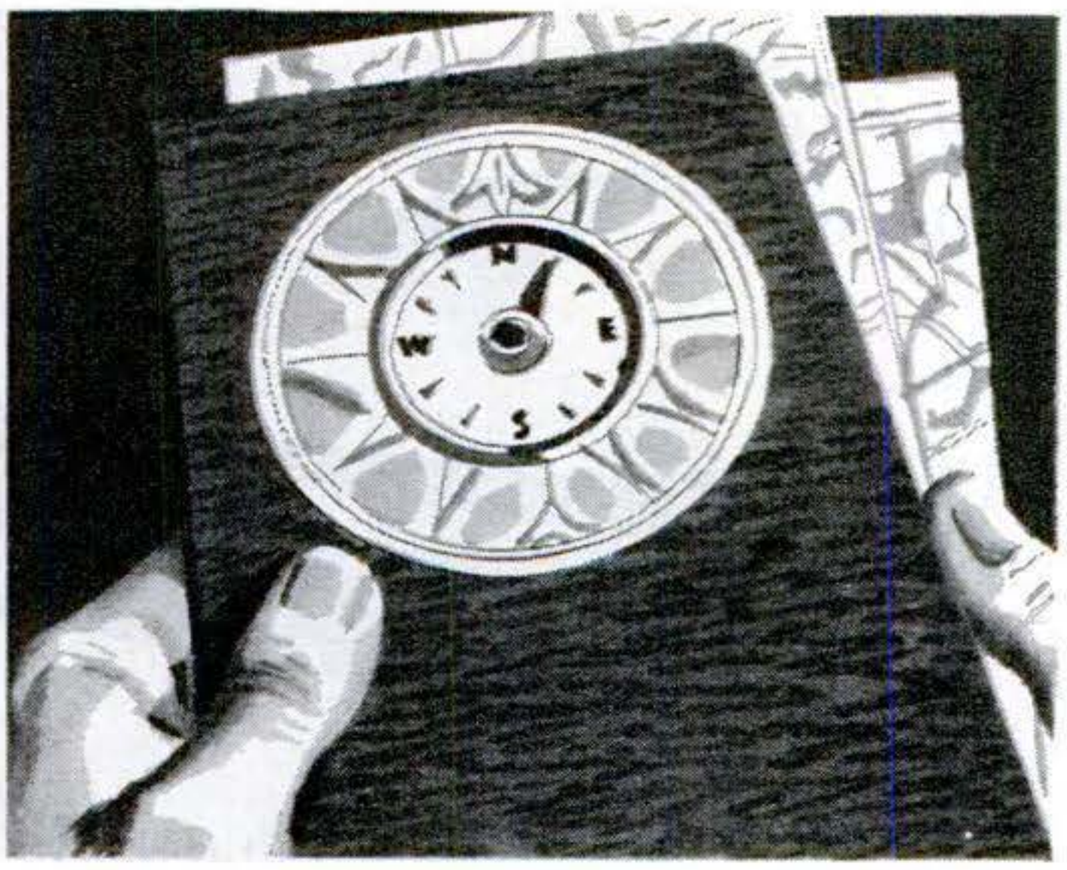
Copyrighted material

# I'd like to see them make...

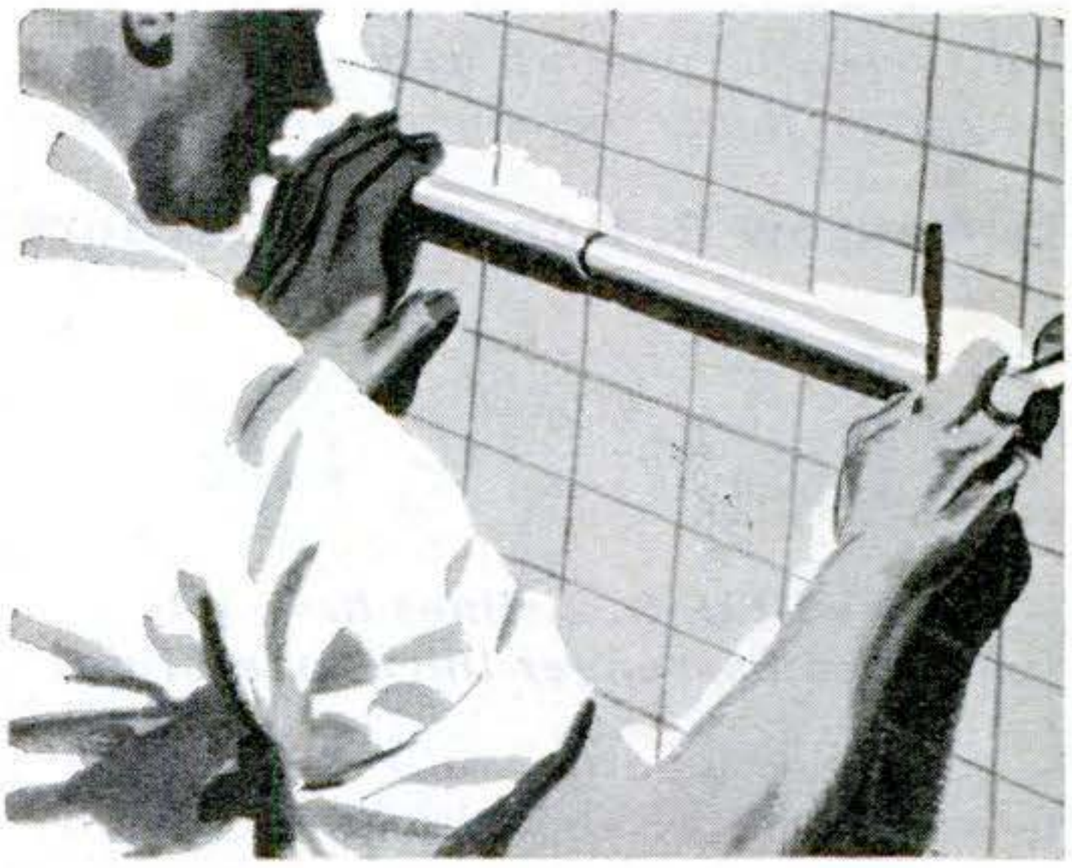
**Everyone has his own pet idea of some gadget he would like to see in general use. What is YOURS? *Popular Science Monthly* will pay $5.00 for each one published. Use government postcards only. Contributions cannot be acknowledged or returned.**



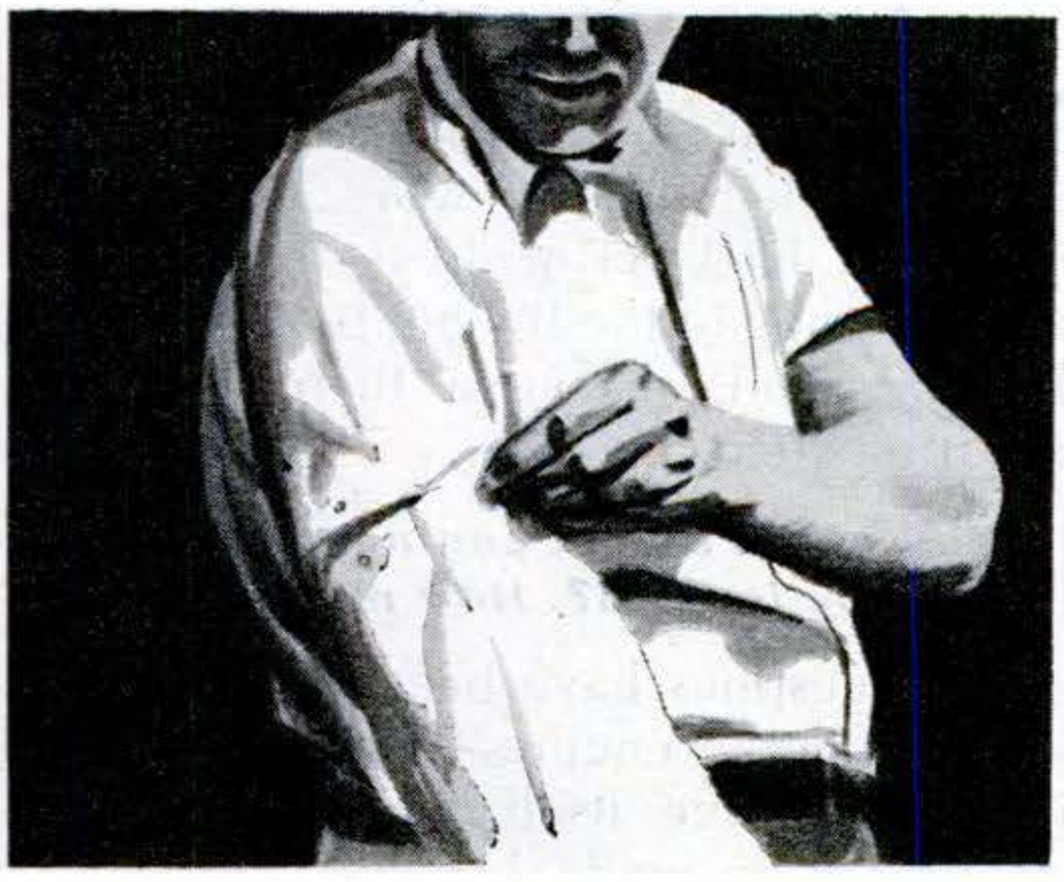

**A REAR-VIEW MIRROR** that was marked off in such a way that you could tell roughly how many feet behind you the next vehicle was following.—*W. R. Brown, Hornell, N. Y.*



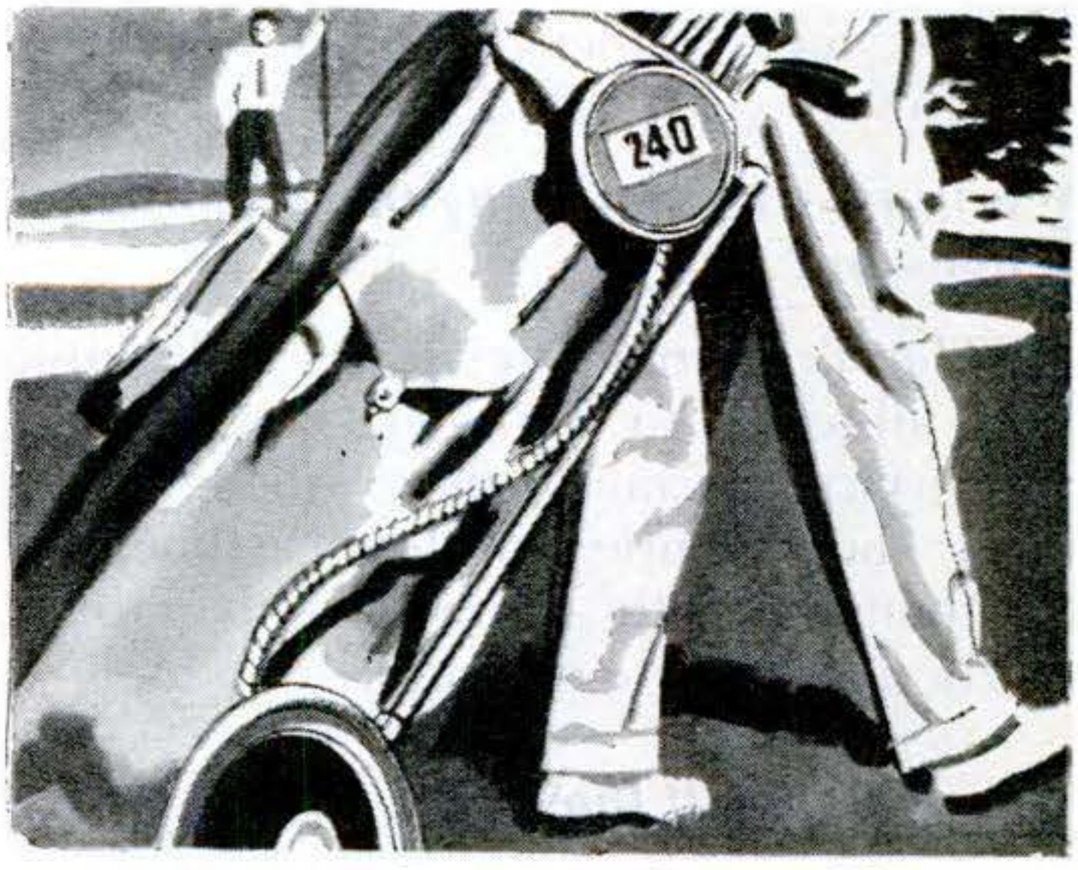
**A BOOK OF ROAD MAPS** with a compass in the cover so a motorist could be sure he was not only on the right road but traveling in the right direction.—*Roy Chisholm, Jackson, Mich.*



**ADJUSTABLE TOWEL RODS** that could be extended like curtain rods to exactly the right length and attached securely to the wall studs. —*Mrs. Bessie Combs, So. Zanesville, Ohio.*



**A SHIRT** with sleeves that would snap on and off to transform it quickly into a sports shirt, and do away with rolling up and rumpling sleeves.—*Alan Steger, Huntington, N.Y.*

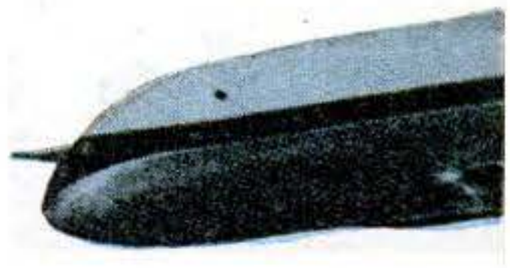



**A GOLF CART** with a meter that would register in yards to enable a golfer to judge the length of his strokes and the distance to the green. —*Edward Conklin, Farmington, Conn.*



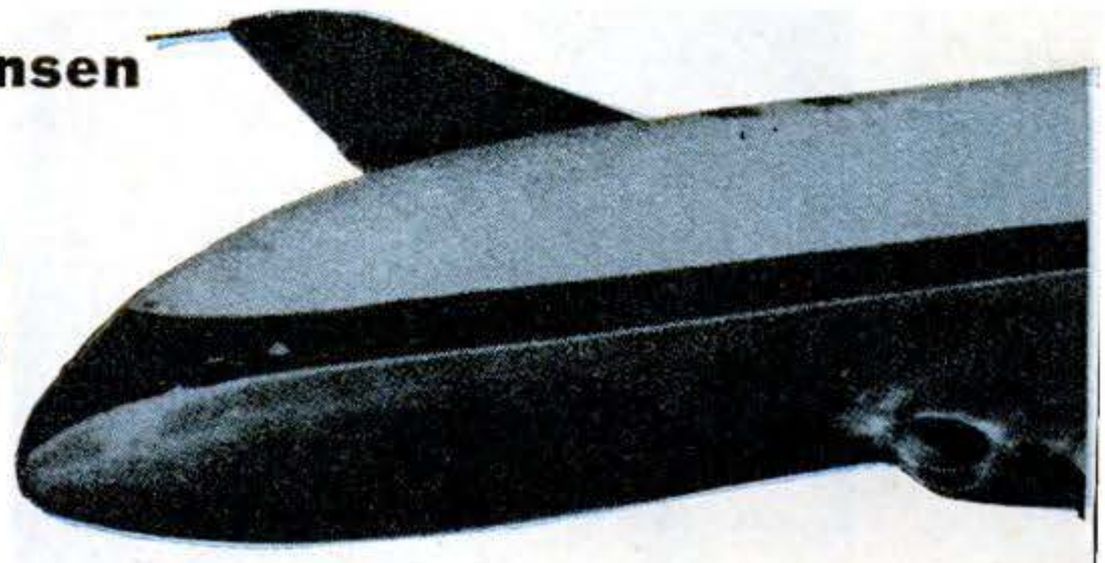
Copyrighted material

# QUESTION: How Soon Will You Ride Jets?



*Why don't we have a jet passenger plane like the British? When will our airlines have jet planes? What will they be like? Those are only a few of the scores of questions about jet transports we've received from our readers. To satisfy their interest and curiosity (and our own), we passed the questions along to aircraft manufacturers, aeronautical engineers and airline operators. Although there were disagreements, we were able to combine the answers, compromising here and there, to come up with what we believe is a pretty accurate forecast of what the future holds for commercial jet transport in this country.*

**By Andrew R. Boone and Herbert O. Johansen**



## Here Are the ANSWERS:

**Q** ***When will U. S. airlines have jet-powered passenger liners operating?***

**A** By 1958 at the earliest—on long-range runs—although a limited number may be flying before that.

**Q** ***How fast will they fly?***

**A** About 600 miles an hour—perhaps 650 tops. Supersonic airliners are probably 15 years off.

**Q** ***Will they be able to fly the Atlantic nonstop?***

**A** The first commercial jets will undoubtedly go into long-range, luxury service. Certainly they will be able to fly the Atlantic nonstop eastbound. Westbound, with severe unfavorable winds, may require one stop.

**Q** ***How high will they fly?***

**A** At 40,000 feet—or even higher, up to 50,000. That is because the jet engine is most efficient at high altitude. It means rapid climbs to altitude and rapid descents for landings.

**Q** ***Will they differ much in appearance from the airliners flying today?***

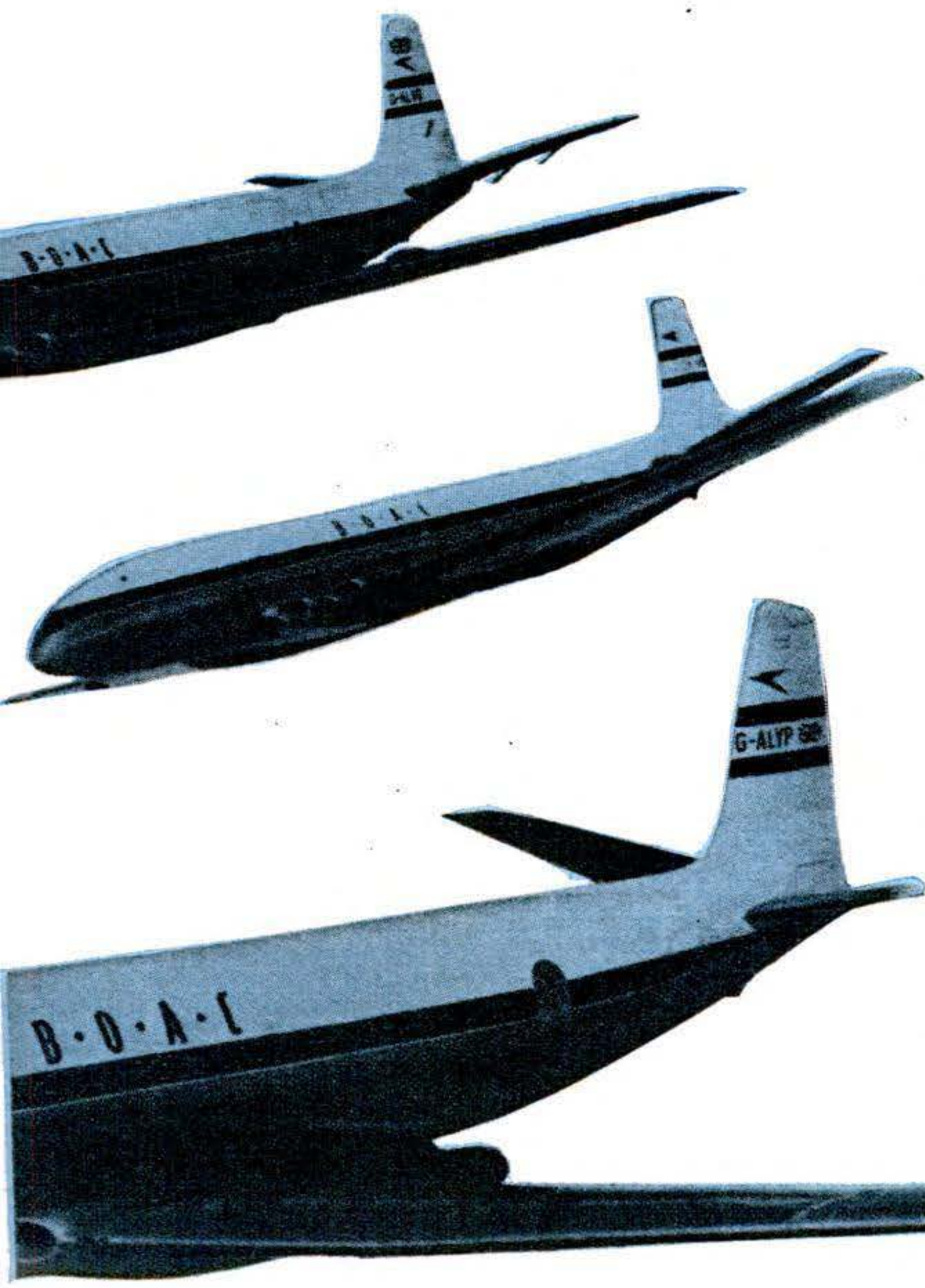
**A** Not so far as the fuselage or body of the plane is concerned. Greatest difference will be in the wing, which will be swept back 35 or 40 degrees, much like the wing of the Boeing B-47 Stratojet bomber. And, of course, there won't be any propellers.

**Q** ***How about the jet engines, where will they be located? How many?***

**A** Suggestions have been made for locating the engines (probably four) in the fuselage itself, in the wing, or suspended in pods beneath the wing. Pods probably will be adopted for several reasons. That would lessen fire haz-



Copyrighted material




**Q** ***Okay, but why wait for 1958—when the British already have the jet Comet in service? Why don't our airlines buy Comets?***

**A** The de Havilland Comet is a good experiment in jet transport, but it is uneconomical to operate. Our airlines don't want it because it is too slow (about 490 miles an hour); it doesn't seat enough passengers (36); its engines burn too much fuel. It is true that the British are developing Comet II and a Comet III, which will be faster and larger. A few months ago Capt. E. V. Rickenbacker, president of Eastern Air Lines, flew to England waving $100,000,000 to buy himself a fleet of Comets III. He came home with his money unspent. Pan American World Airways' Juan Trippe, a more modest shopper, had slightly better luck. The British sold him just three Comets III, not to be delivered for four years. By that time (barring war), our airlines may be able to buy jets made in the U.S.A.

ards, for it must be remembered that the greater part of the length of a jet engine is one continuous hot flame; structure of the plane would be less vulnerable in case turbine blades, whirling at 1,000 miles an hour, should break; it would lessen noise for the passengers.

**Q** ***What kind of ride will jet give us?***

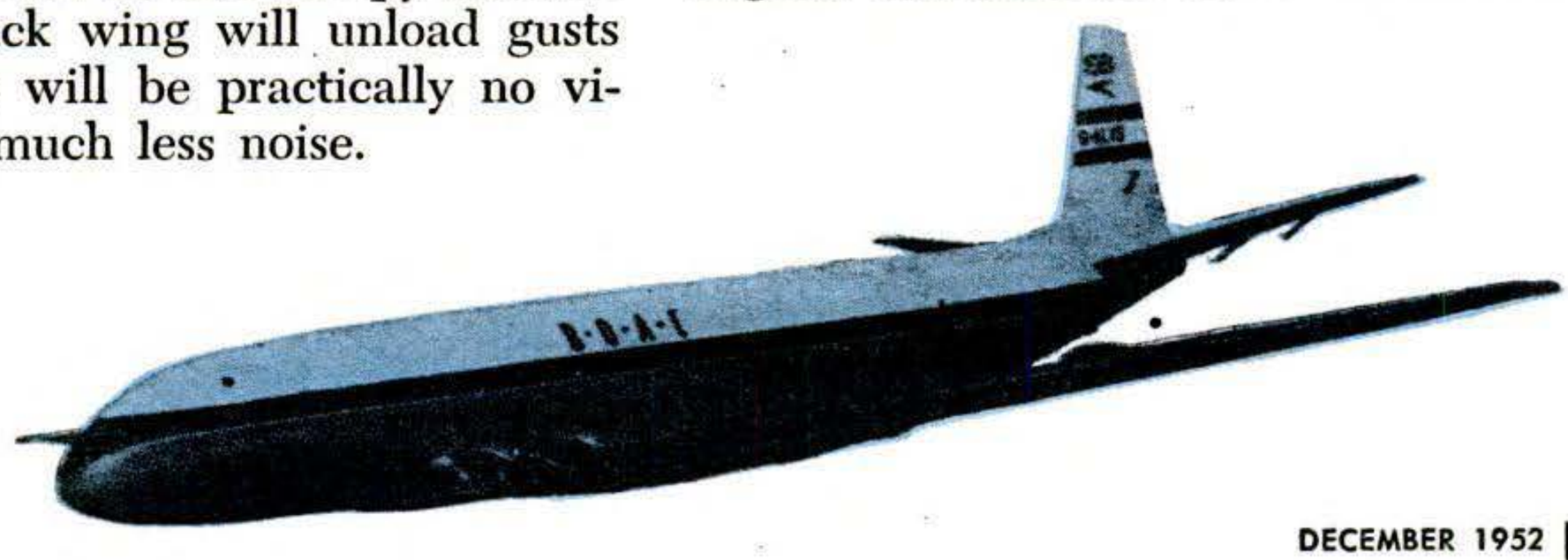
**A** It will be fast, therefore less fatiguing because you'll be in the air a shorter time. Flights will be less bumpy because the swept-back wing will unload gusts faster. There will be practically no vibration and much less noise.

**Q** ***How is it that the British can afford to fly this uneconomical Comet?***

**A** As British airlines are government owned, they can afford to operate a limited number of jet transports at a loss to gain operational experience (from which we will profit) and to bring prestige to British products.

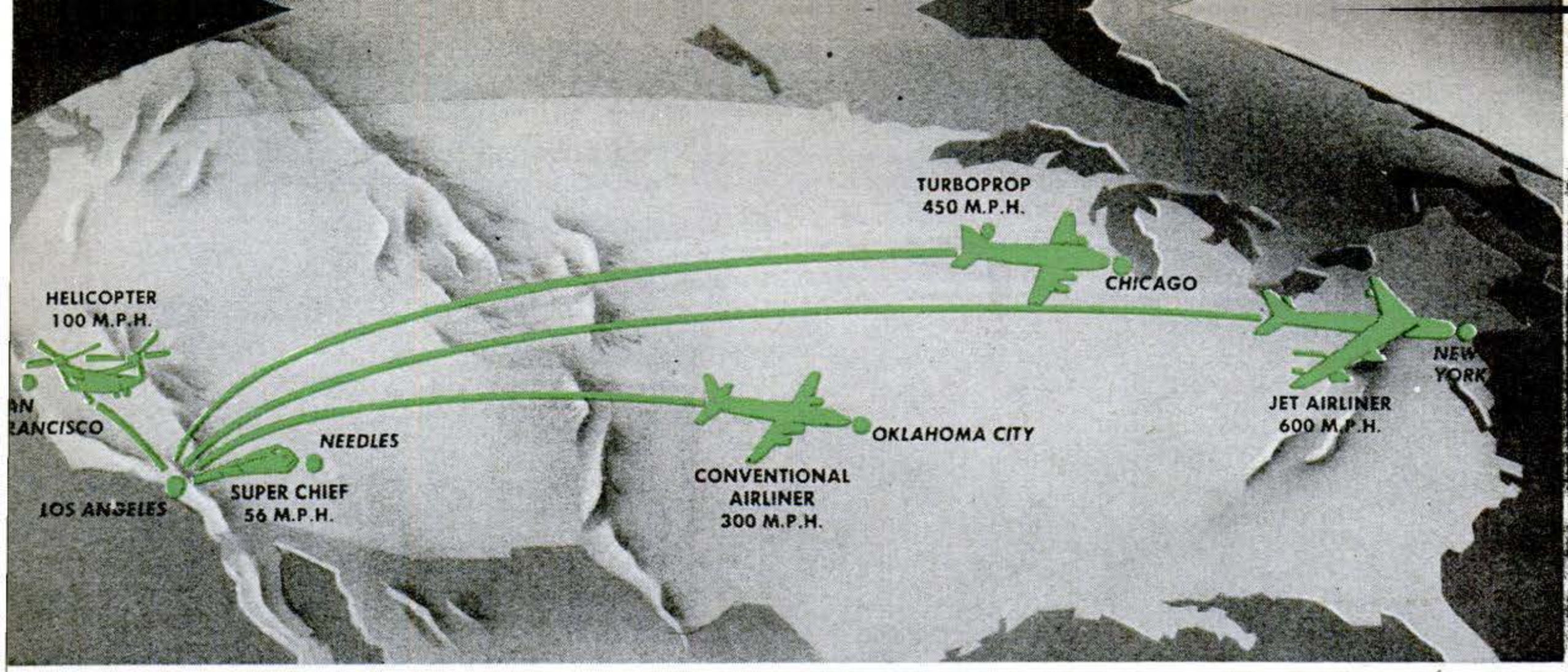
**Q** ***But how come we haven't built even an experimental jet transport?***

**A** Military priority is probably the main reason. Just about 100 percent of research and development on jets in this country, the building of airframes, engines and accessories, has been for the






Copyrighted material




**CROSS-COUNTRY IN FOUR HOURS** is goal set by U.S. airlines for jet transport. Map above shows where train and other types of planes would get you in that time. Crack Super Chief train is tortoise in this race—it makes four stops, has to climb steep grades.

Air Force and Navy air arm. The requirements of a military jet and a commercial jet are about as far apart as those of a tank and a civilian automobile.

And with military orders keeping them busy, airplane manufacturers have been reluctant to expand and gamble the $30,000,000 to $40,000,000 estimated as the cost of producing a flying prototype of a commercial jet airliner.

**Q *Has Britain's achievement changed this attitude?***

**A** Yes. It looks as if a years-long stalemate is about to be broken. The manufacturers have been marking time, keeping their hands in with engineering studies and drawings of a jet transport, but waiting for the airlines to come through with orders before going ahead with actual construction. The airlines, on the other hand, have been more or less waiting for a flying prototype to be handed to them on a platter. Now, with the British Comet and its world-wide publicity, U. S. manufacturers realize that they'd better get on the ball. And U. S. airlines are indicating that they are ready to buy American jets—if they can get what they want. The president of one of the big U. S. airlines said recently: *The Douglas DC-7 and the Lockheed Super Constellation will probably be the last of the large transport aircraft with reciprocating engines. After them will come the jets.*

**PASSENGERS** aboard British jet Comet are able to balance cards and cigarettes in flight, demonstrating the absence of annoying vibration. Jet flight is also less noisy.

**Q *And what are the aircraft manufacturers doing about it?***

**A** Getting into the act, according to recent announcements of three of our leading manufacturers of commercial air transports:

- Boeing claims that it will have a jet transport, suitable for commercial needs, ready for flight testing in the summer of 1954. Boeing will undoubtedly draw healthily on its experience in designing and building the B-47 and B-52 military jet bombers. Two versions are contem-



Copyrighted material

**A SIX-ENGINE JET AIRLINER** as visualized by Boeing engineers. Swept-back wing is borrowed from the company's B-47 Stratojet bomber and fuselage is reminiscent of the new Boeing eight-jet heavy B-52 Stratofort. Other plane makers also have jet designs.

plated, one domestic and the other for international service. They will seat from 60 to 97 passengers.

• Douglas is staking $40,000,000 on putting a commercial jet in the air—a four-engine DC-8 powered by 15,000-pound-thrust engines. Again there will be two versions, according to plans, carrying from 70 to 120 passengers. Douglas has a full-scale mockup of the proposed DC-8 to sell prospective airline customers—U. S. and foreign.

• Lockheed has publicly offered a $2,500,000 commercial jet transport. Says a company spokesman, "Lockheed has had discussions with airlines about a jet transport . . . It would have a substantial performance margin over any existing jet transport in speed, range, passenger comfort, and above all, *in cost per seat mile.*"

**Q *Why doesn't our military experience permit us to switch to commercial jets right away?***

**A** There's a lot of difference between military and commercial jet airplanes. One is fuel consumption. Although a great deal of progress has been made in the 10 years of jets, the engines still are too thirsty for the airlines' pocketbooks. A lot of research is now going into this problem, and various solutions are in sight.

**Q *Are the airlines ready, otherwise, to fly jets?***

**A** Not yet. There are also some tough operational problems to solve.

**Q *For instance?***

**A** Longer runways is one. Military jets have longer runways than are available to commercial planes. The airlines would like a jet that can take off and land at any of the big civilian airports.

**Q *But don't military jets sometimes use civilian airports?***

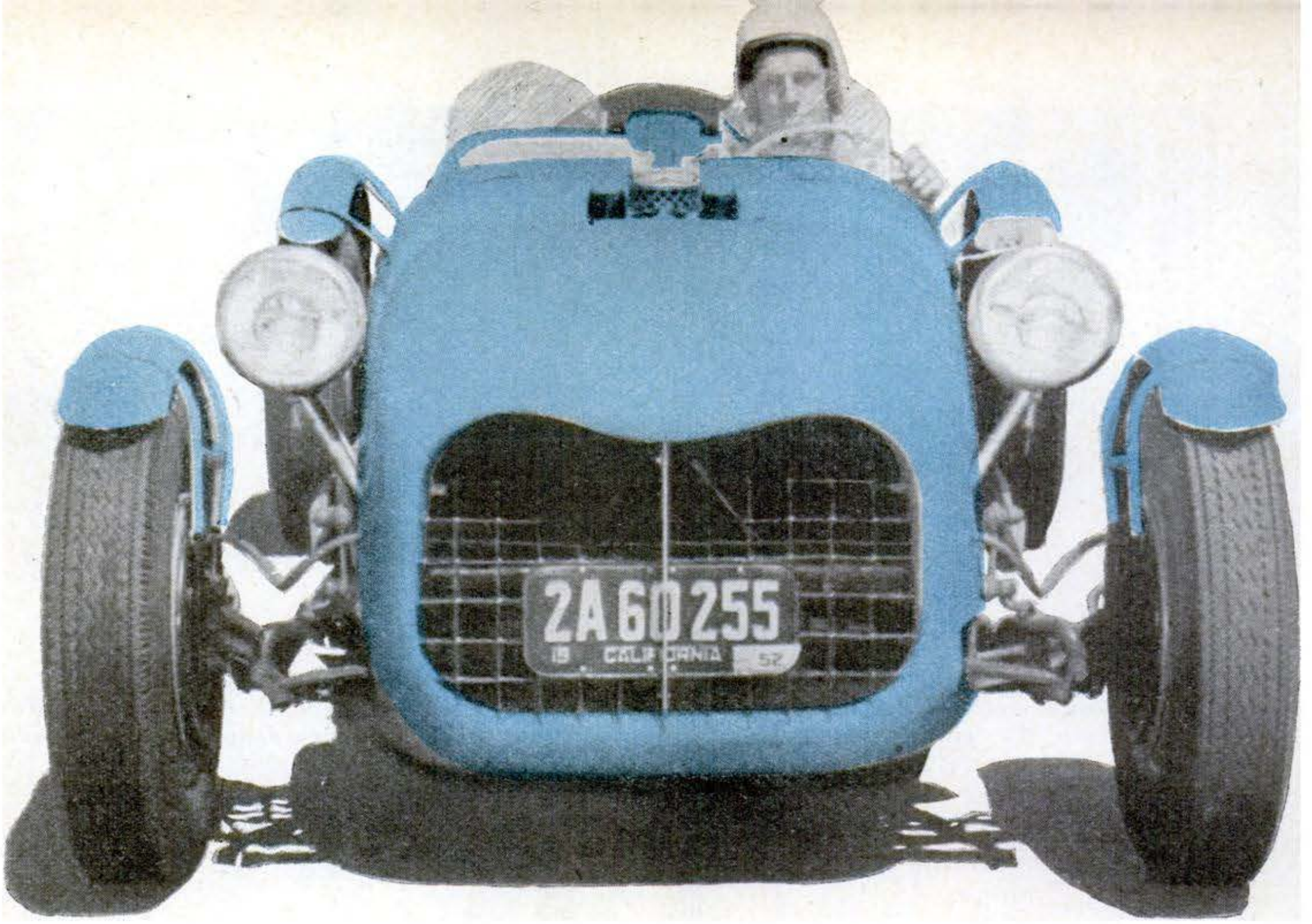
**A** Yes—but military jets have assists that are not considered practicable for civilian use. Jet power is inefficient at low take-off speeds. The military uses the added boost of rockets to get them up in the air. Rockets are both noisy and create a lot of smoke. The latter nuisance has been licked, though, by a new 4,300-pound-thrust British Sprite rocket. Tried on the Comet, it left no smoke trails.

How to shorten landing runs is an even more serious problem. In conventional airplanes, you can reverse the propellers to act as brakes. With jets, the military shortens landings by releasing a drag parachute at the tail. For commercial jet, it is generally agreed that

[*Continued on page 240*]



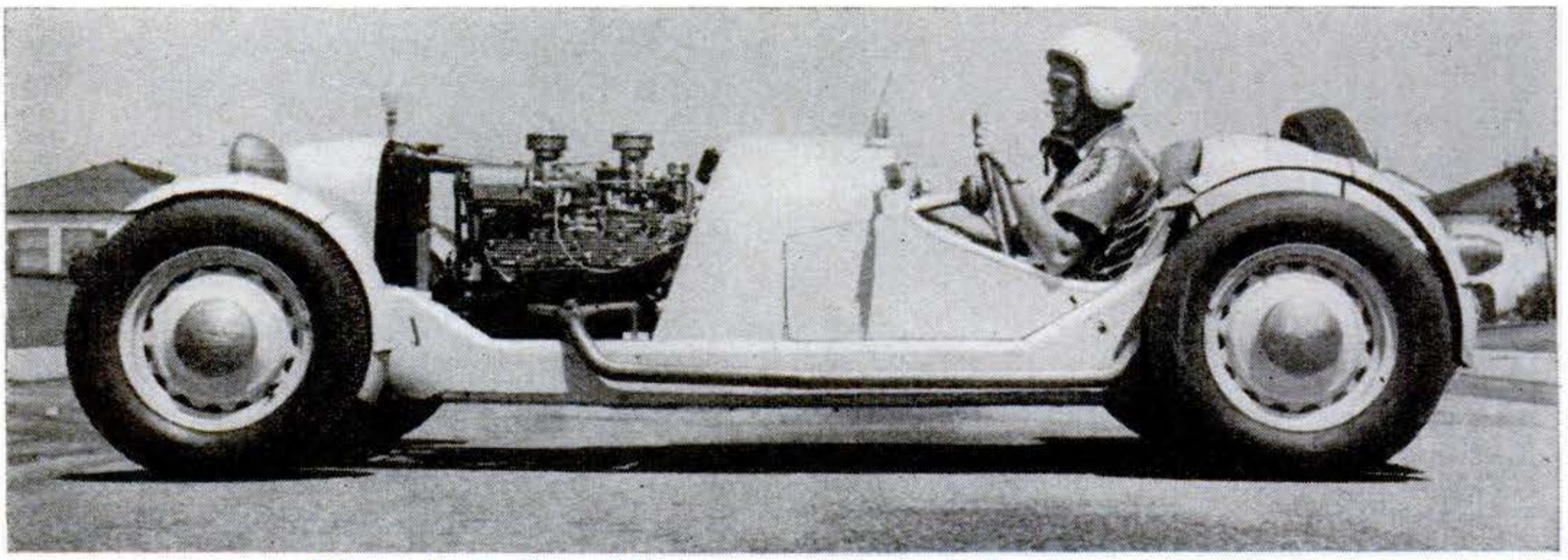
Copyrighted material




# Aircraft Engineer Builds Sports Car Like a Plane

WHEN he set out to build himself a sports car, C. G. Manning decided to apply some of the principles he had learned as a structures engineer at the El Segundo, Calif., plant of Douglas Aircraft. Using glass fiber for a body of maximum rigidity and minimum weight, powered by a Mercury motor hopped up to 180 horsepower, he forged a four-wheel thunderbolt that tips the beam at a buoyant 1,615 pounds—almost 300 less than a 54-hp. MG.

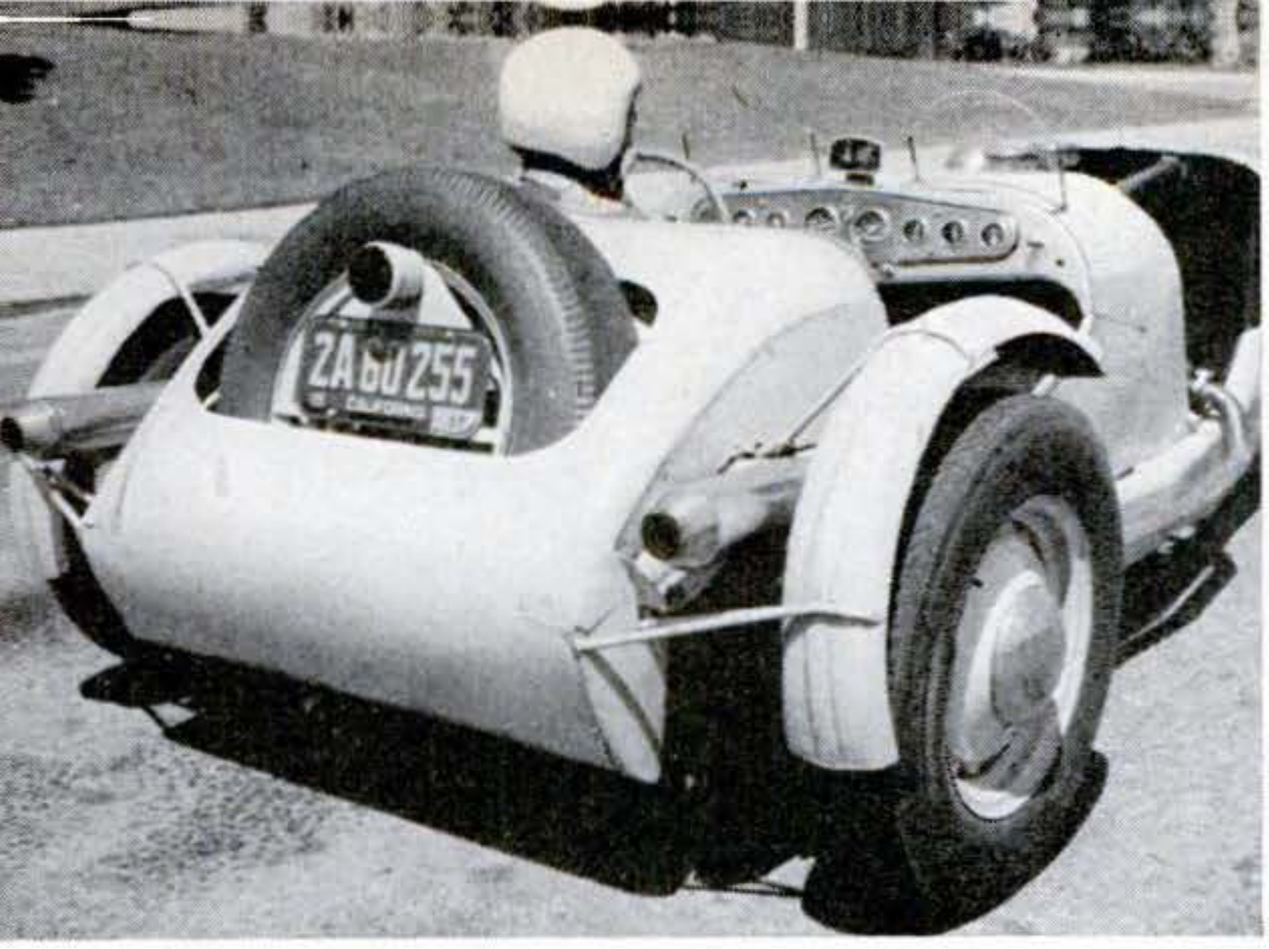
In nine months he has raced his Manning Meteor to third spot in the national sports-car championship.



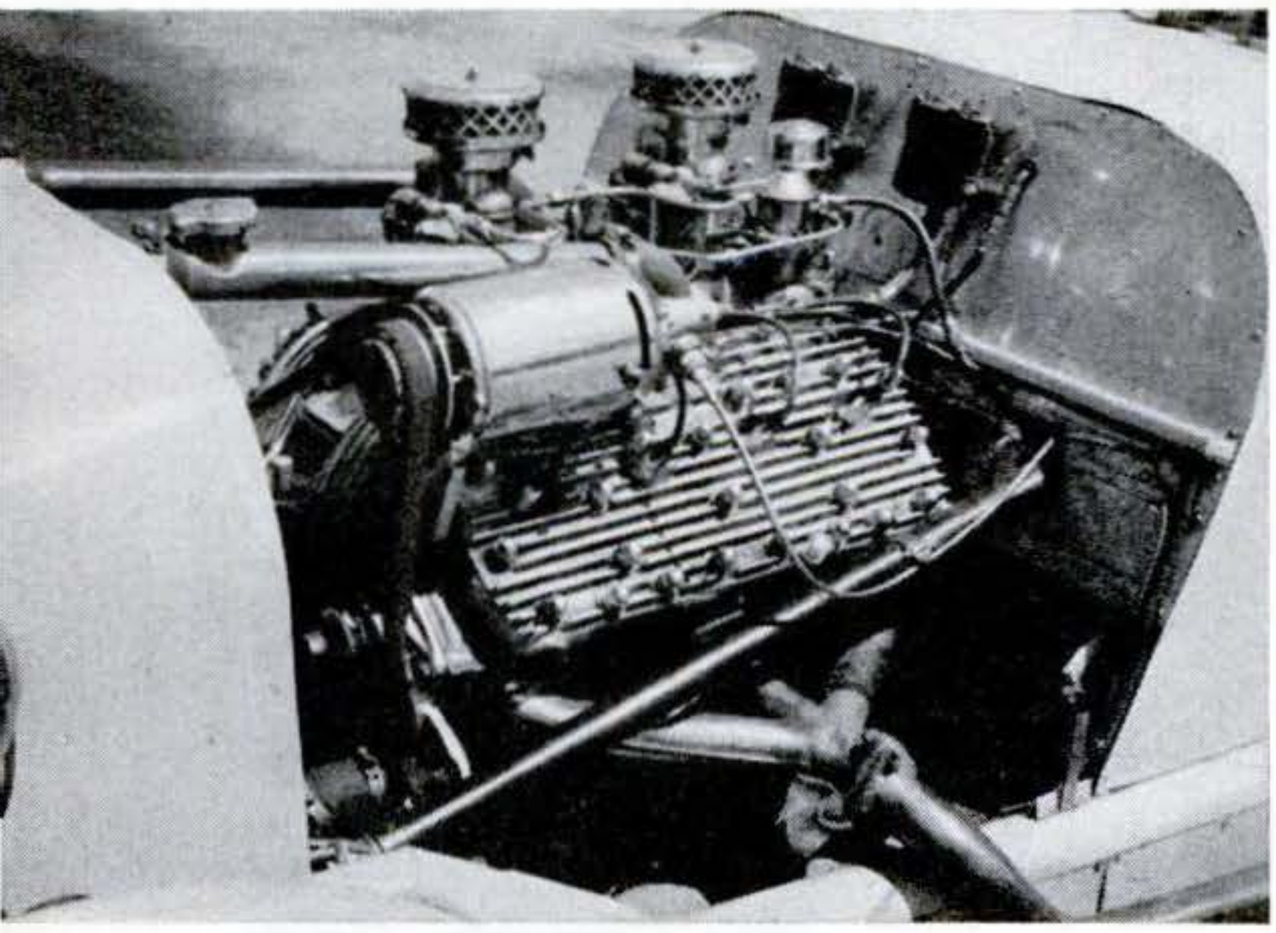
**LIGHT YET TOUGH,** Meteor's body is 10 times as strong as average sports car's, Manning claims. Wheelbase is 100 inches, length 133 inches. Hood is off here to show engine.



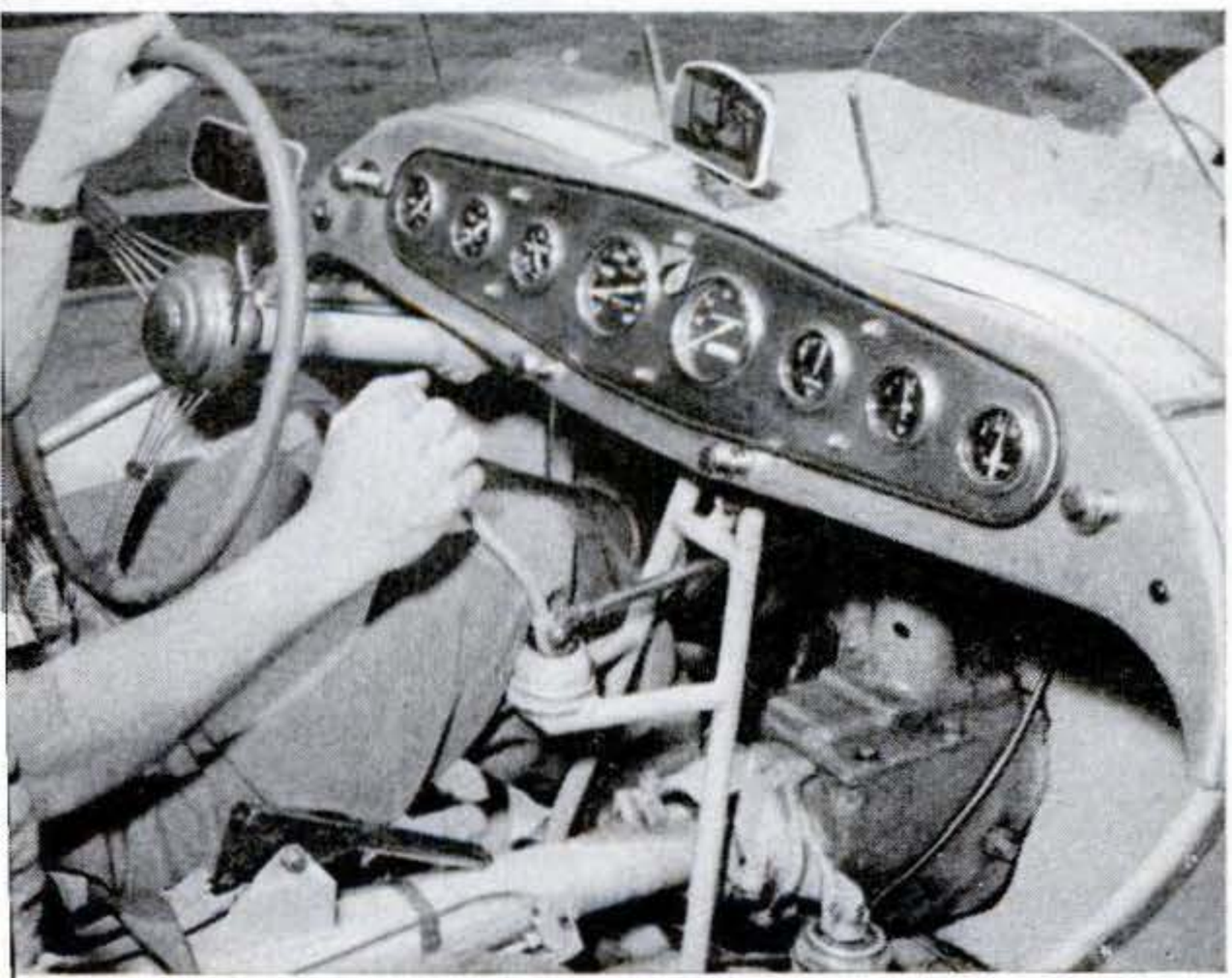
Copyrighted material




**SQUARE CORNERS ARE EASY TO TAKE** in this 33-inch-high road hugger. Front and rear axles are Ford. Tailpipes, packed with glass fiber to cut noise in town, are cleaned out for racing.



**HIGH-COMPRESSION HEADS,** twin carbs and special cams upped the output of this Merc mill to 180 horsepower to boost car to 130-m.p.h. speed on half-mile straightaway.

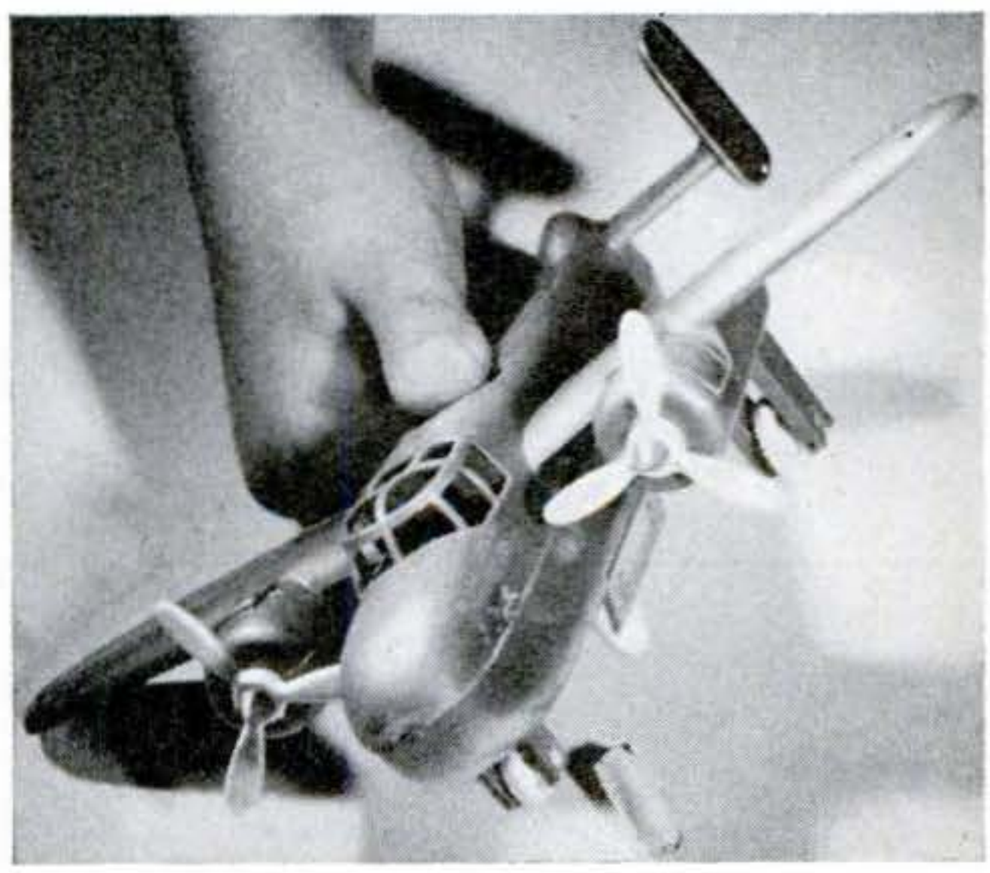


**INSTRUMENTS** include tachometer, manifold-pressure gauge. Steering assembly is Ford.

## Dutchman Builds "Saucer"

EUROPEAN model-plane makers have been bitten by the flying-saucer bug—Claude R. De Vries of Rotterdam built the lightwood one above.

Powered by two Jetex engines, it does its spinning 200 feet up. An Italian model about the same size (PSM, Oct. '52, p. 132) hit 87 miles an hour.

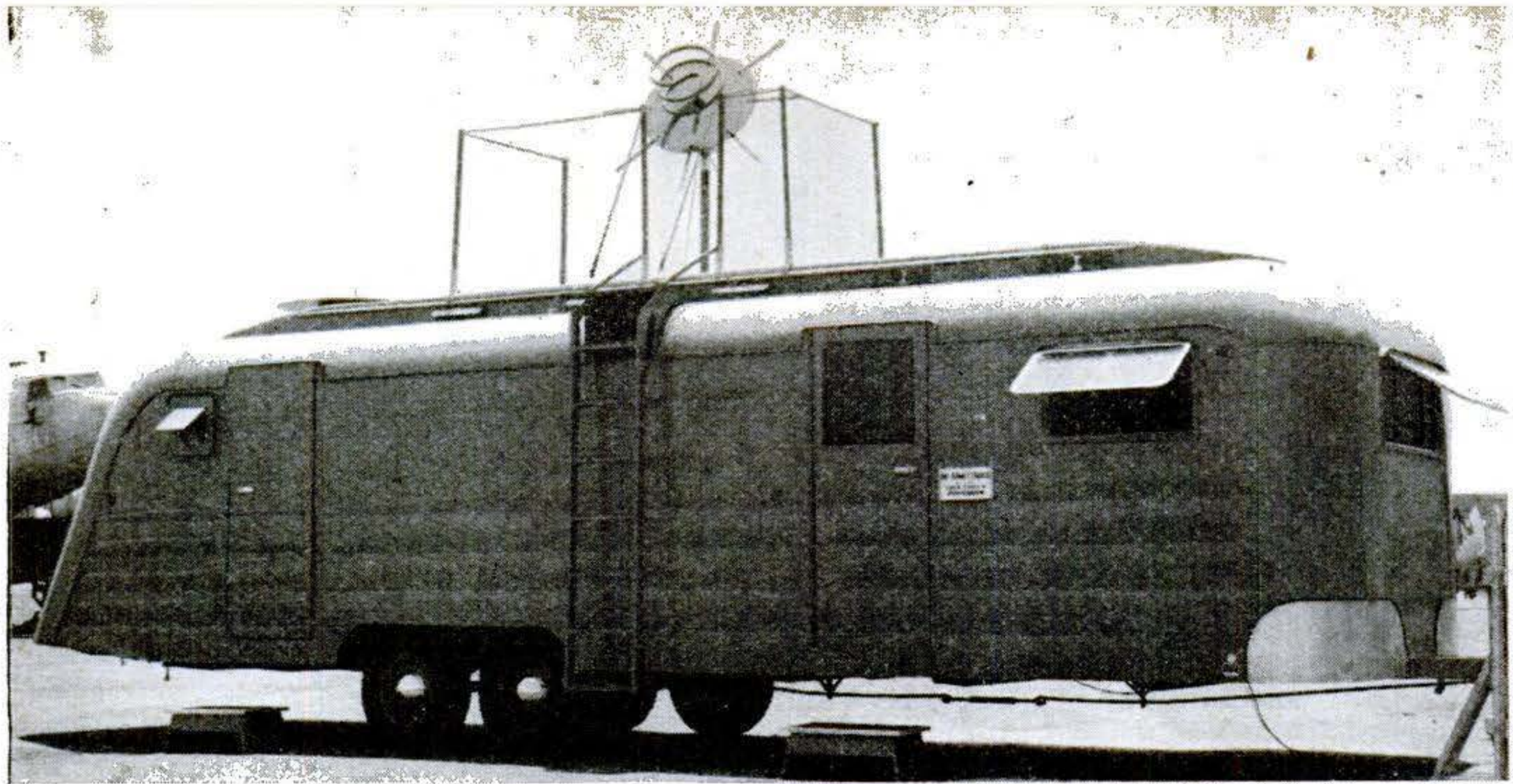


## Bombs Away!

WHEN the blister dome on top of this plastic toy bomber is pressed, two bombs drop from its two-door bomb bay. Modeled after a B-25 Mitchell, the plane is made by Ideal Toy Corp., 200 Fifth Ave., NYC. Price: about $1.00.



Copyrighted material

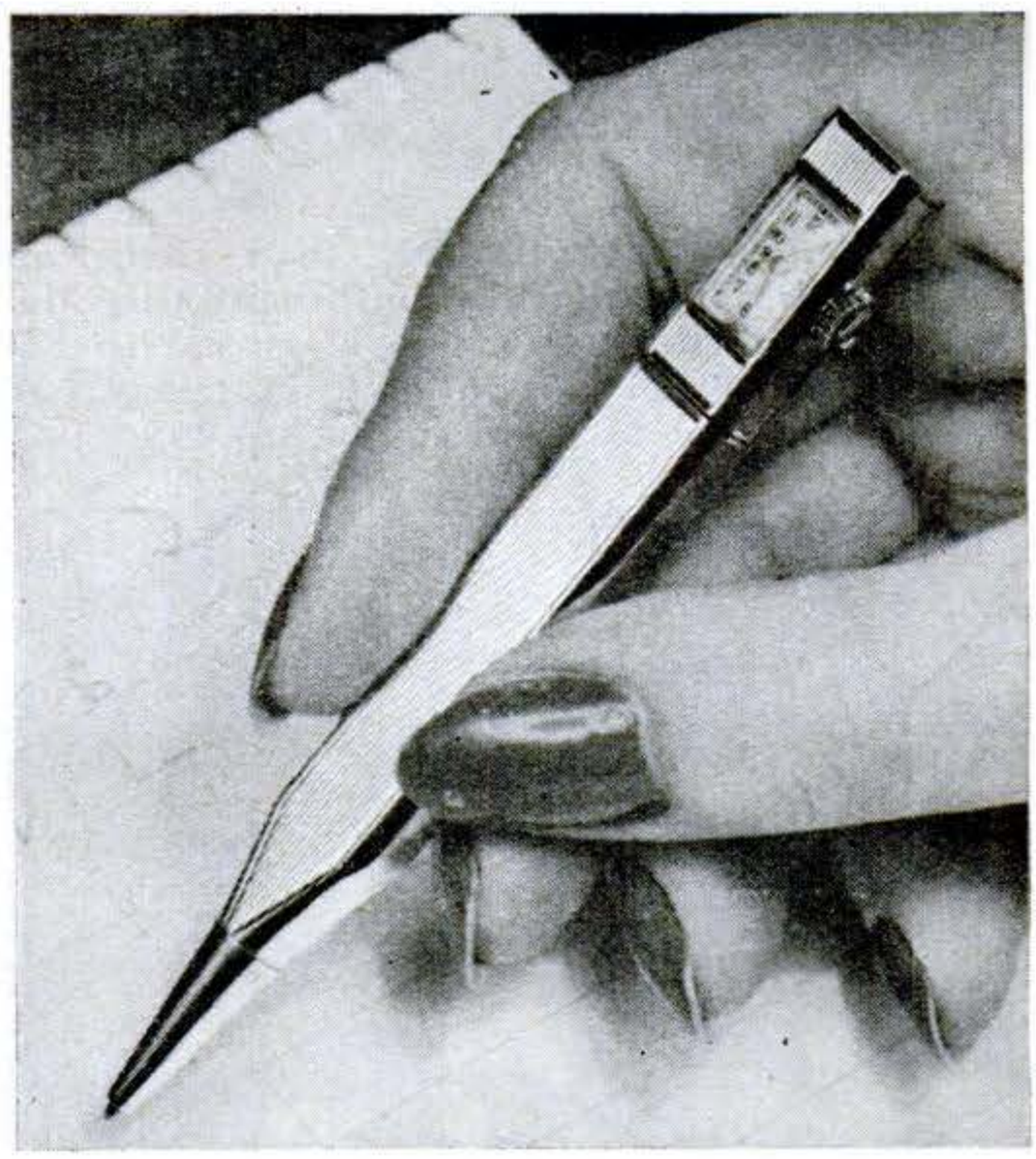


## Plane Sends Data to Trailer

SEATED before twin scopes in a trailer (right), engineers follow what's going on in supersonic planes under flight test. Data transmitted by radio from 176 measuring devices in the plane show up as lines on the scopes. An automatic analyzer translates the lines into air speed, engine temperature and other information. Engineers can immediately order a pilot to repeat tests or caution him to slow down. Douglas developed the 110-pound airborne equipment.

## Umbrella Has a Window

THIS umbrella lets a gal see what's ahead in foul weather. The Vinylite plastic window is said to resist abrasion and to take repeated foldings without cracking or creasing. The Rainseth Umbrella Co., 26 West 31st St., NYC, makes it.

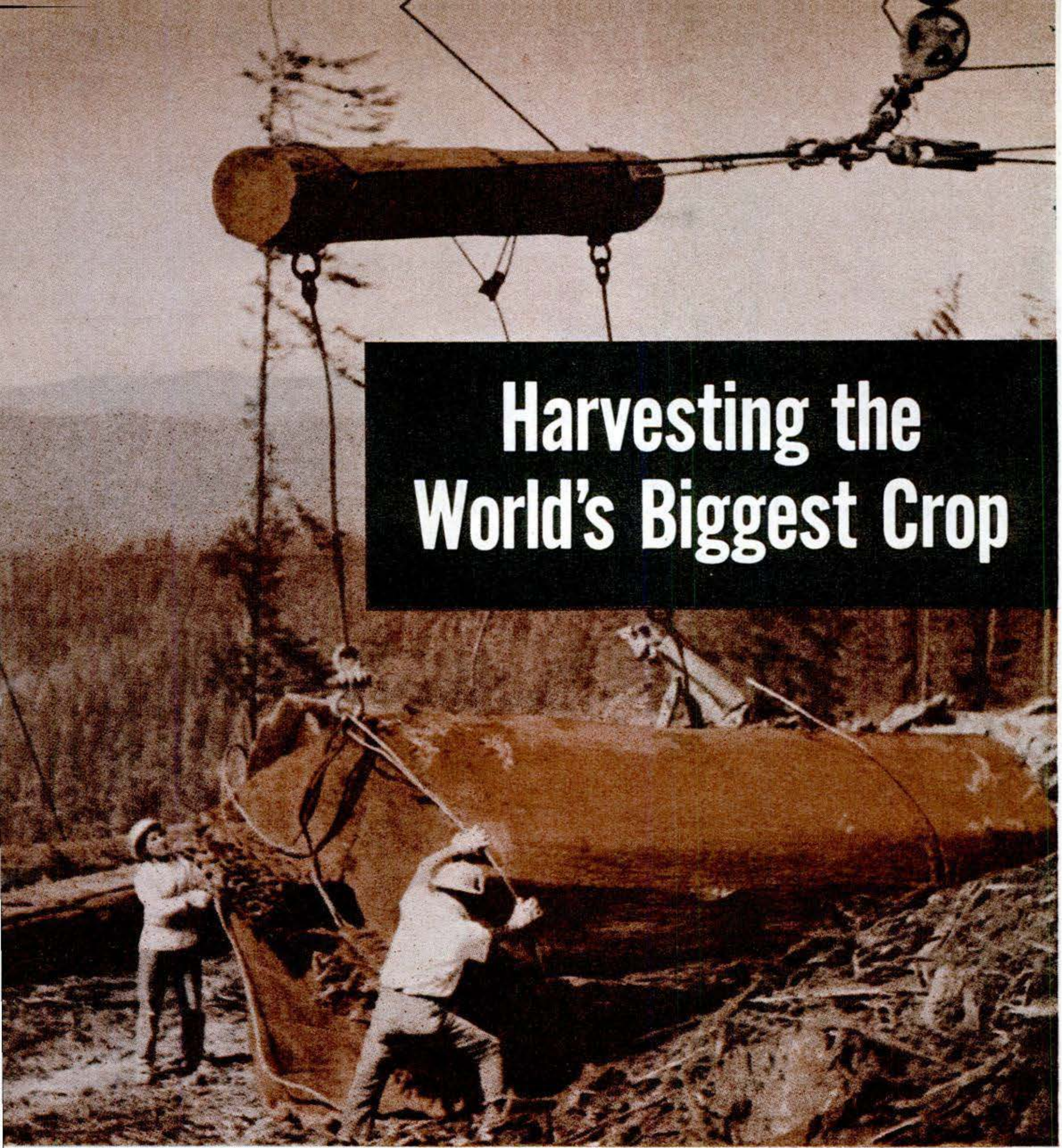


## Pencil Tells Time, Too

JOTTING down notes with one eye on the clock is no trick for appointment-conscious salesmen and secretaries equipped with this pencil watch. The gold pencil is engine-turned and the watch movement has 17 jewels. Made in Switzerland, it costs $150.



Copyrighted material



# Harvesting the World's Biggest Crop

Twenty-foot redwood log is eased to earth after ride across a California canyon on high line.

***Selective cutting, tree farms and new processing methods add up to a constant supply of redwood.***

**By Andrew R. Boone**

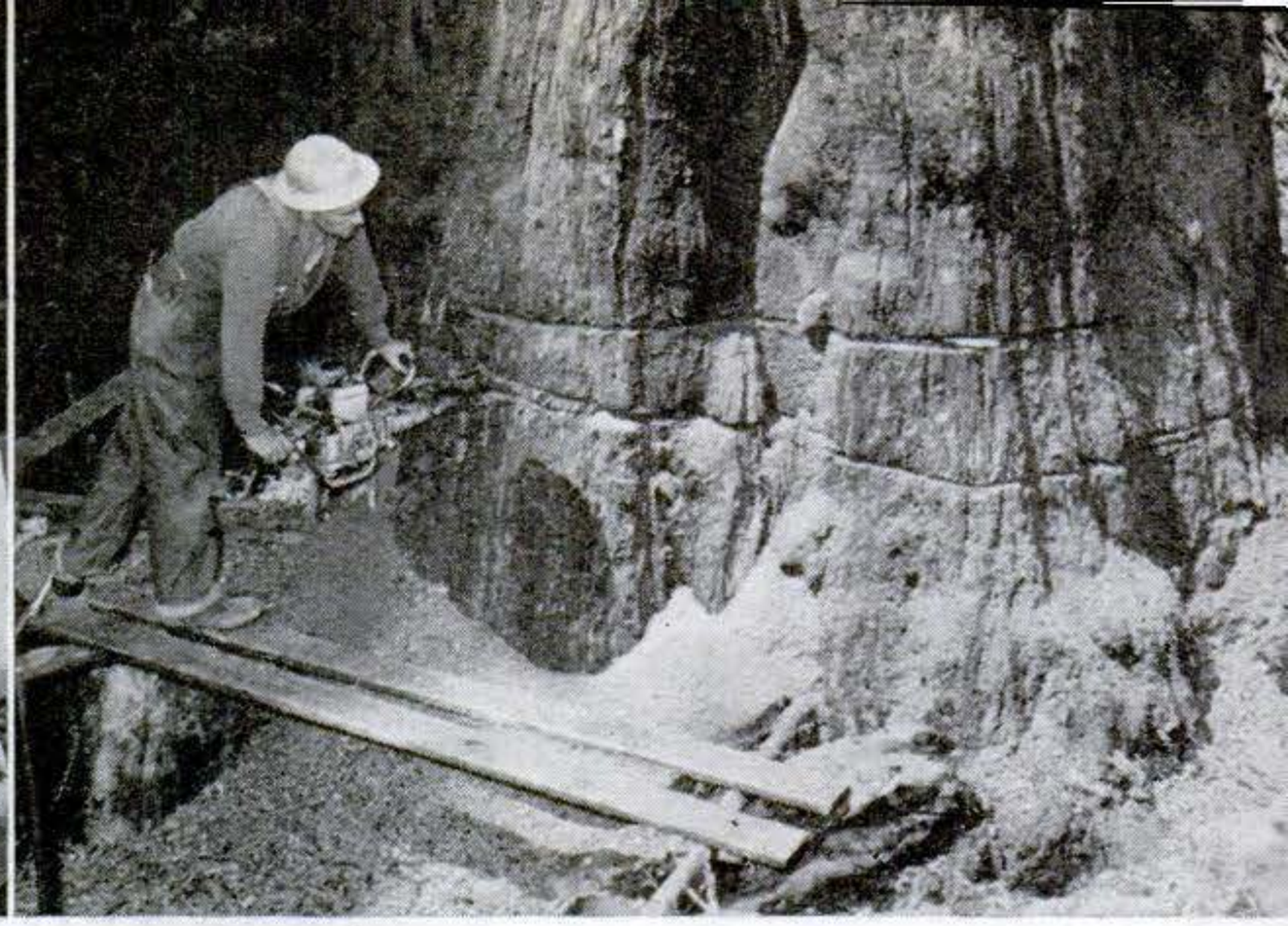
THE biggest crop in the world isn't wheat or cotton or corn. The biggest—literally—is a tree, the gigantic redwood. One of these is the tallest tree in the world, rising 364 feet into the air. A single redwood can provide enough lumber for more than 20 homes. An acre of redwoods has been known to yield a million board feet of lumber, 40 times the average production of other forests.

And today, say the redwood lumbermen, their giant trees are really a crop, one that can be harvested over and over again, like any farm product. That's something new. In the past, we've treated the redwoods more like a mineral to be



Copyrighted material

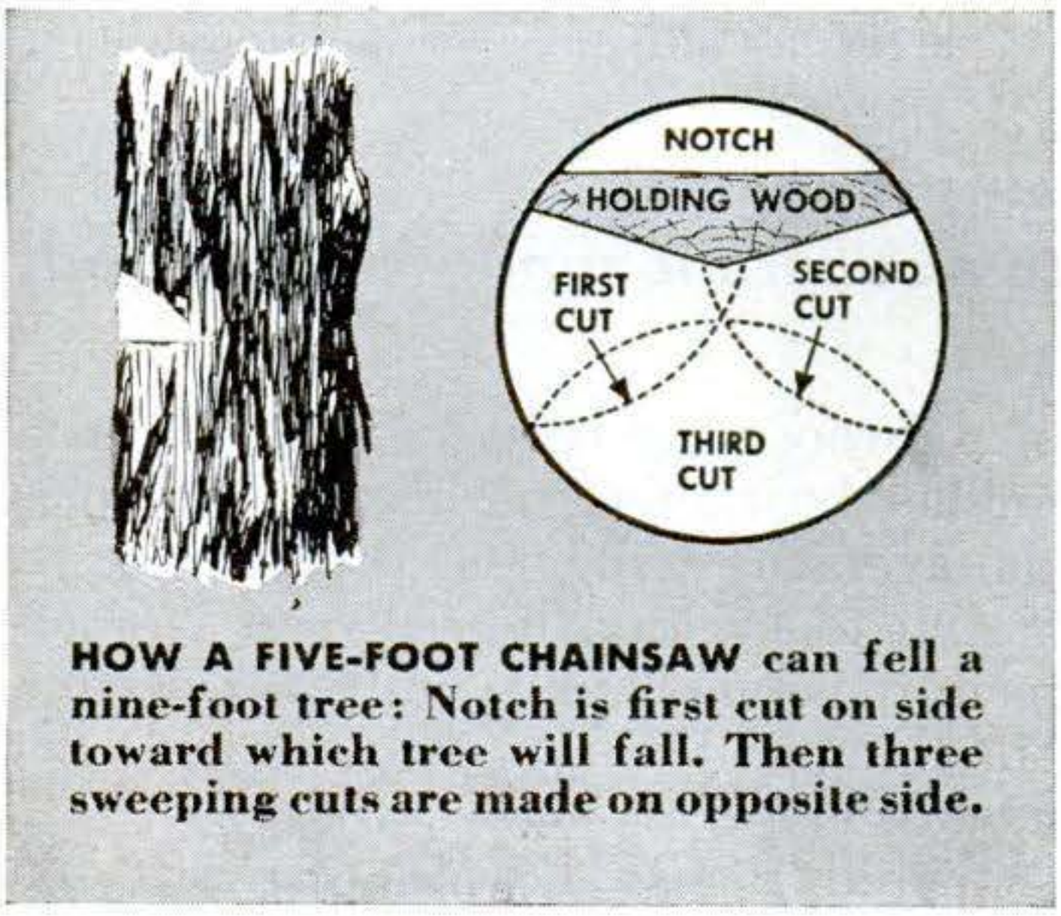
**1 SELECTIVE CUTTING** enables redwoods to be grown like farm crops now. Redwood-expert Prof. Emanuel Fritz (above) marks a tree for harvest at the Van Duzen tree farm.



**2 FIVE-FOOT CHAINSAW BITES** into a 12-foot-thick redwood, will fell it by cuts shown in diagram at bottom of page. Here, notch is being made in side toward which tree will fall.

**5 TIMBER-R-R-R!** Tree as tall as a city block is long crashes down an alley. "Widow makers"—big limbs near top—fly end over end as giant smashes limbs off other trees.

**6 THIS REDWOOD WAS FELLED** by a dragsaw making two cuts, a wedge and a final slice. Note shattered holding wood. Now branches will be cut off and the trunk sawed into logs.




**HOW A FIVE-FOOT CHAINSAW** can fell a nine-foot tree: Notch is first cut on side toward which tree will fall. Then three sweeping cuts are made on opposite side.

mined, snatched from the ground once, never replaced.

In a century we've lumbered off a third of the original redwood forests. If we kept on cutting the present half-billion board feet a year without thinking of the future, the remaining redwoods would be gone in another 60 years.

### *Expert Says Industry to Continue*

But listen to Prof. Emanuel Fritz of the University of California, who knows so much about the forest giants that lumbermen call him "Mr. Redwood." He

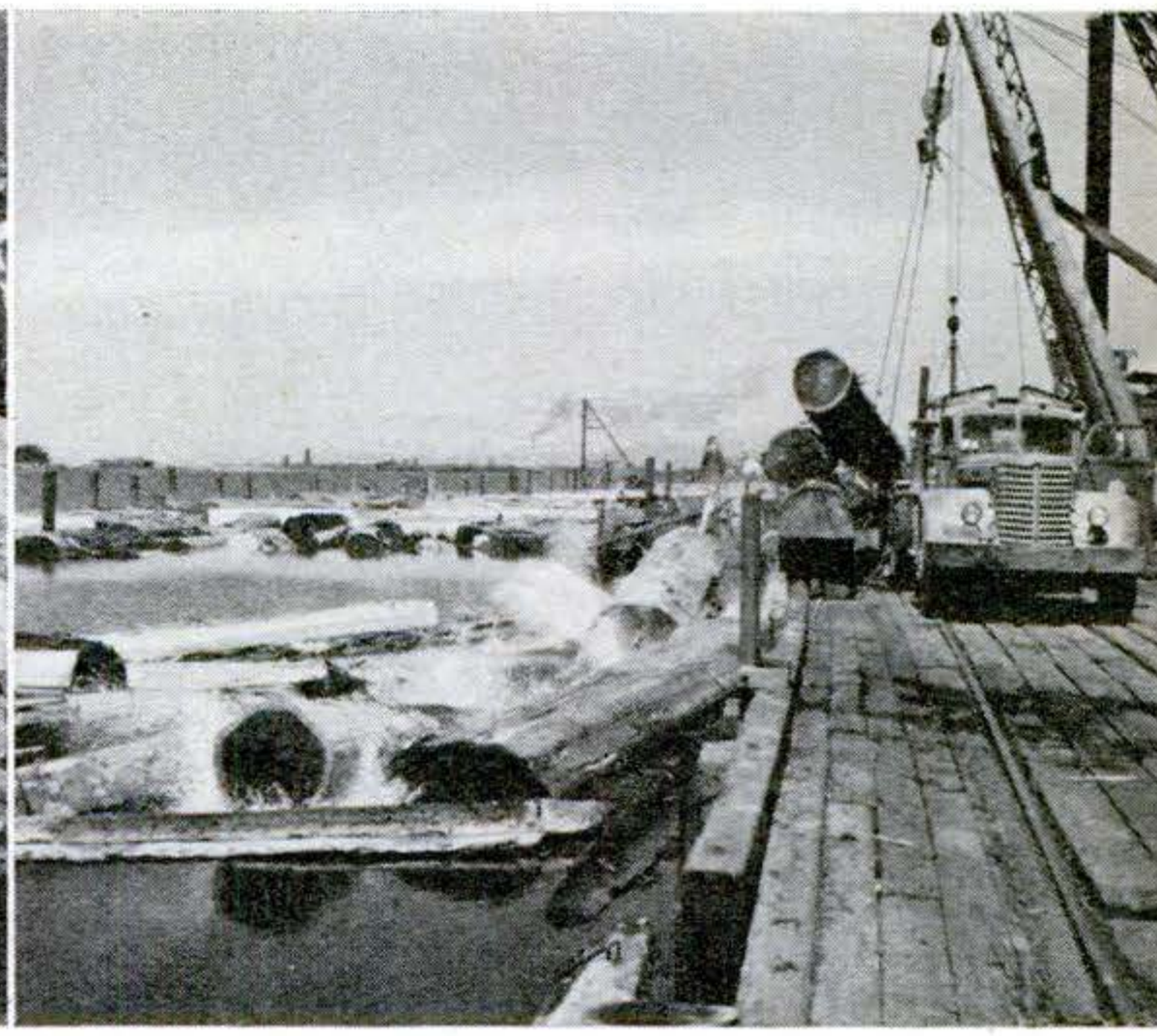


Copyrighted material

**3 LARGER DRAGSAW** is still often used, as on redwood above. Gasoline engine drives an eccentric, which pushes and pulls the blade back and forth like a handsaw.

**4 LUMBERJACKS USE SLEDGES** to knock wood blocks out of notch cut made with a dragsaw. Dragsaw blade is held firmly against tree by spring tension of bar driven into trunk.

**7 WHEEL CATS**—tractor and trailer both on cat treads—snake logs to gathering area, called a landing. From landing they are carried by truck or logging train to sawmill.



**8 LOGS CAN BE STORED** in water or stacked on land. Butt logs—cut from base of trunk—are too dense to store in water because they sink. These "sinkers" are taken by rail to mill.

says, "The redwood-forest industry will continue forever"—thanks to limitation of the annual cut, the use of more second- and third-generation trees, and extension of the tree-farm system.

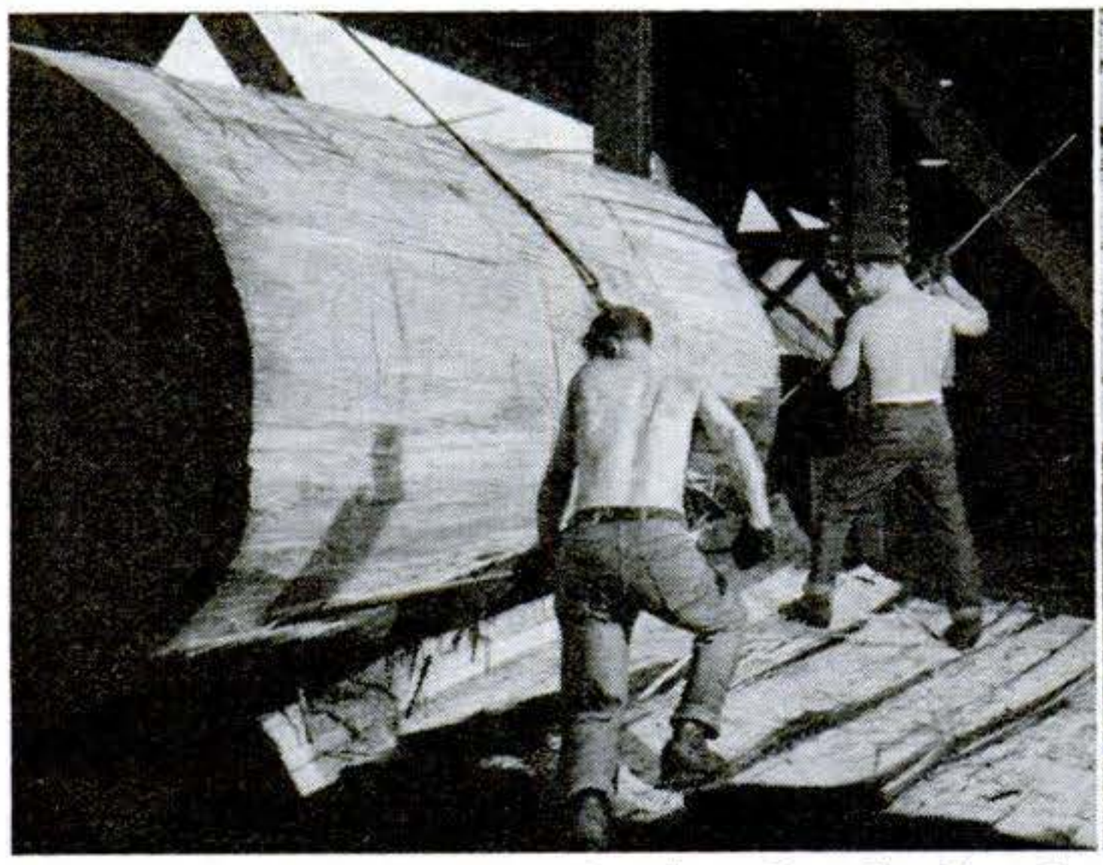
Professor Fritz, an adviser to the California Redwood Association, explains: "As industry uses more and more of a tree for various products, from synthetic boards to chemicals, it finds it can use trees that are both smaller and of poorer quality."

Already the lumberjacks are cutting trees three feet thick that are 70 to 100 years old. That's the redwood equivalent of new-born lamb; some redwoods are more than 2,000 years old. And lumbermen are encouraged because new growth often yields more board feet per acre than the original forest.

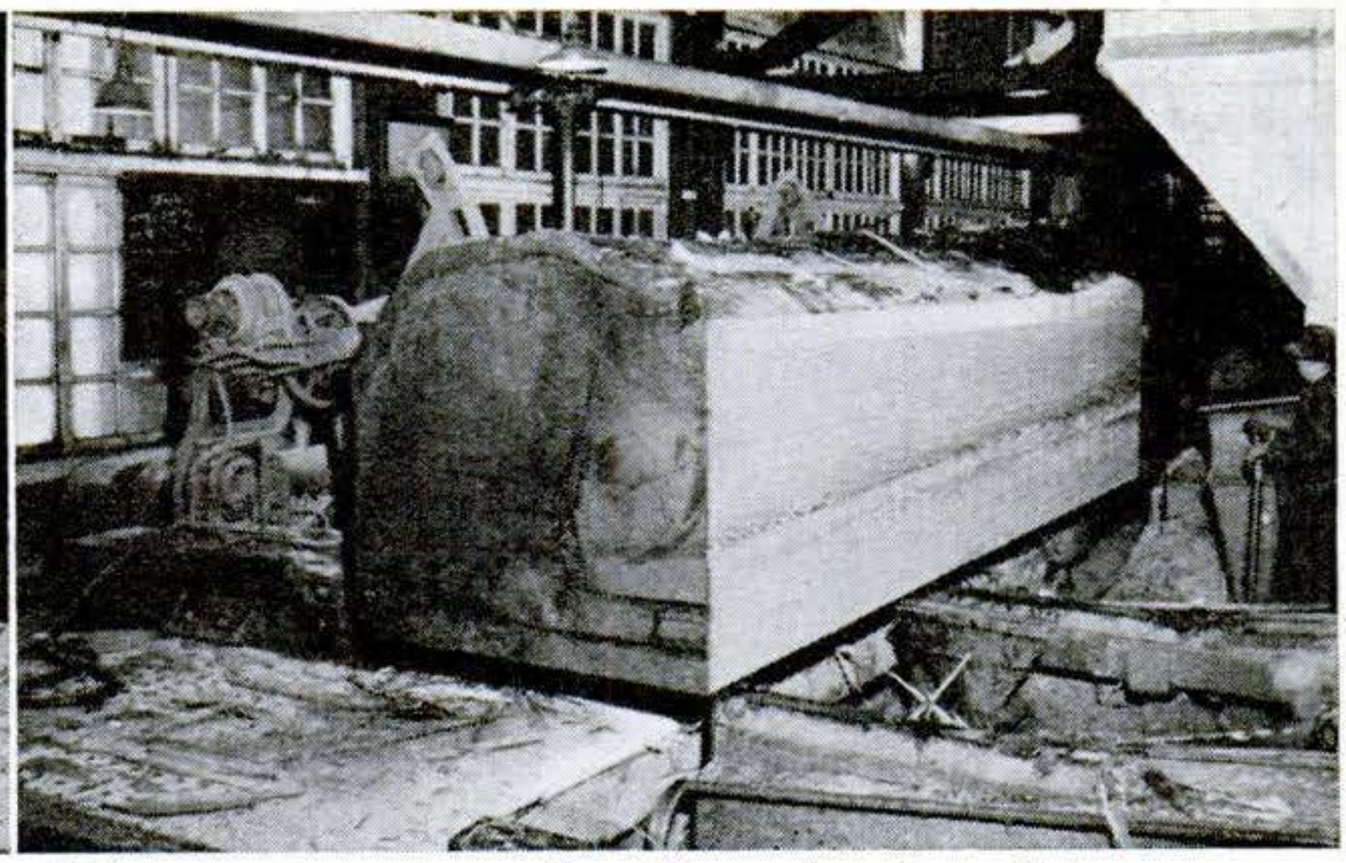
Today everything is used. The narrow boards from smaller trees can be edge-glued into strong wide planks. Powdered redwood chips are being processed experimentally into a plastic. Even the bark, which is sometimes a foot thick, is valuable for sound and heat insulation. Exploded bark fibers are used to seal



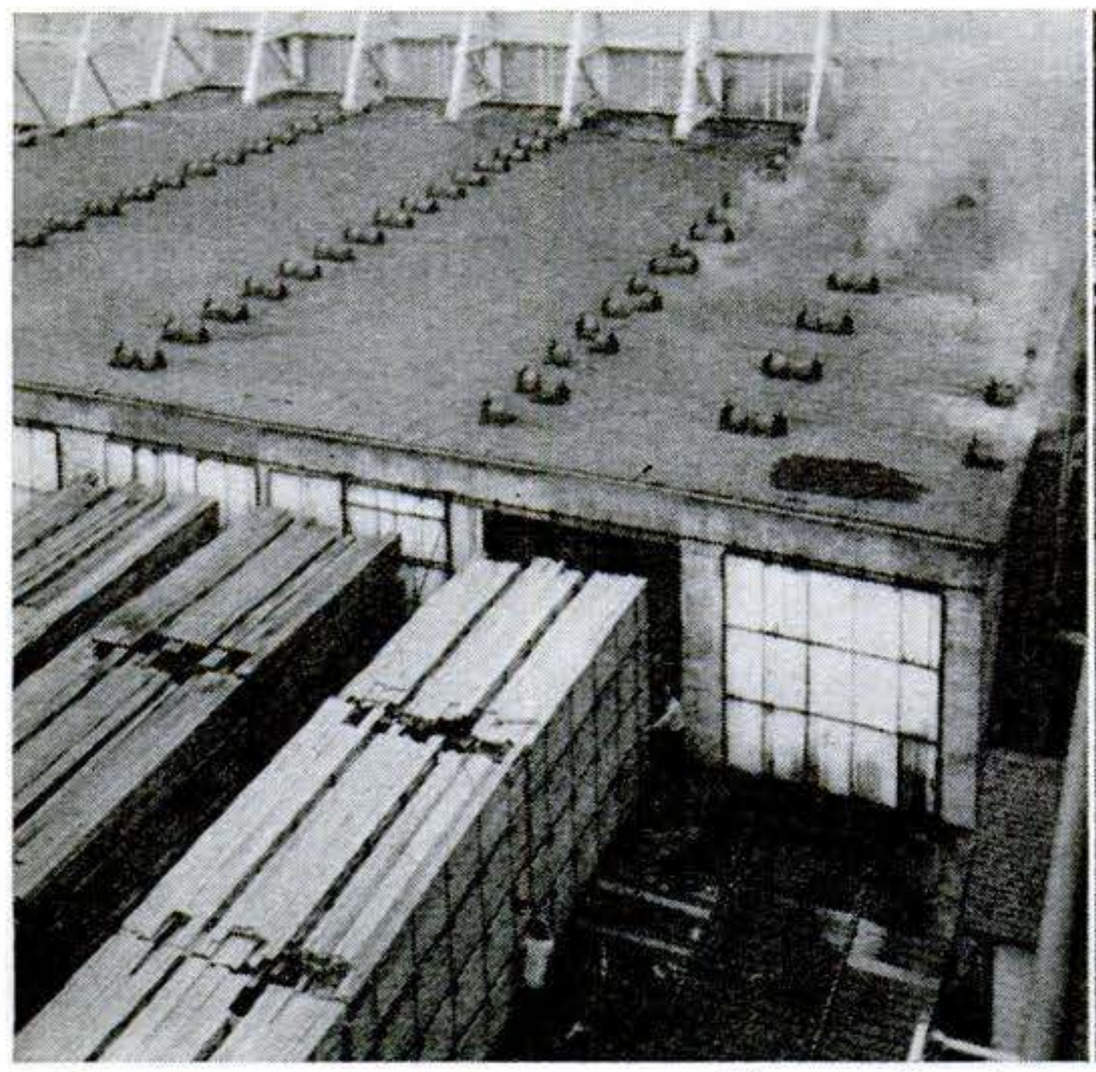
Copyrighted material



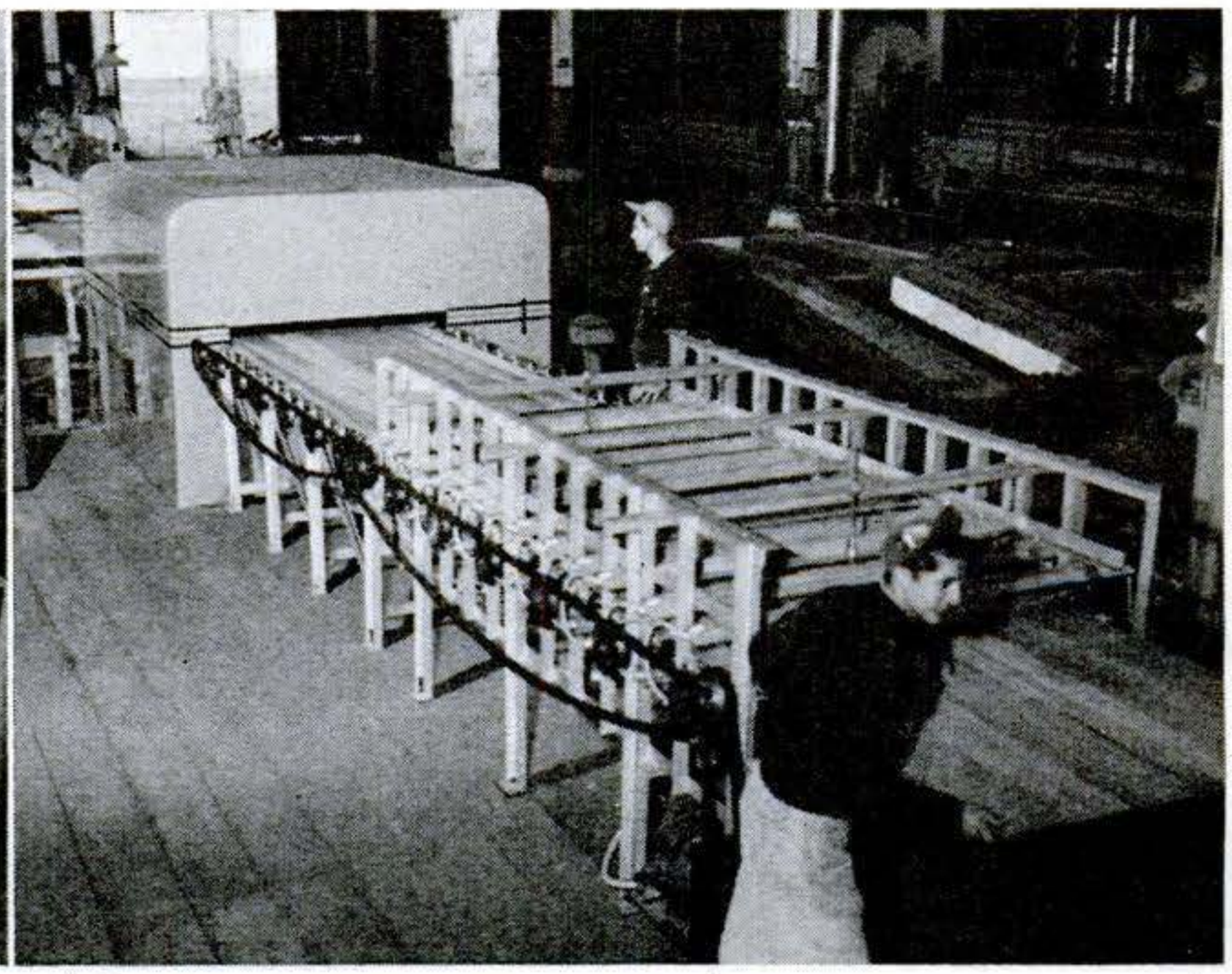
**9 BARK IS PEELED** from logs, either by hand as above, or mechanically. Thick coat enables redwoods to repel insects and diseases, live for centuries. Bark has many uses.



**10 LOG IS SQUARED** for dimensional sawing after de-barking at Pacific Lumber Co. mill at Scotia, Calif. Traveling carriage moves log back and forth into bandsaw.



**11 CURING IS IMPORTANT.** Above, lumber cut to size rolls into drying kilns where it will bake for six days in temperatures rising from 100° to 175°.



**12 WIDE BOARDS ARE MADE** of narrow ones by electronic gluing of edges under heat and pressure. This is one new way smaller trees are used.

crevices in oil wells, and a redwood-bark chemical called sodium palconate is now being used to control the viscosity of oil-well drilling mud.

### *Trees Grow Faster on Farms*

The development that is changing cut-and-move-on lumbering into regular crop harvesting is the tree farm—an area from which only selected logs are cut. The first redwood tree farm was established in 1941; now there are 11 operated by private industry.

Professor Fritz's study shows that on these farms growth accelerates almost miraculously. He points to a group of 20 trees whose ages he recorded as evidence of what thinning the dense growths can do. Although all were the same diameter—12 feet—they ranged in age from 550 to 2,200 years.

Redwood is highly valued because it works easily, retains its shape and grips paint. And it resists rot and weathering as few other woods can. Thanks to the tree farms, it looks as if it will also live up to its botanical name, *Sequoia sempervirens*—"forever-living Sequoia." END



Copyrighted material

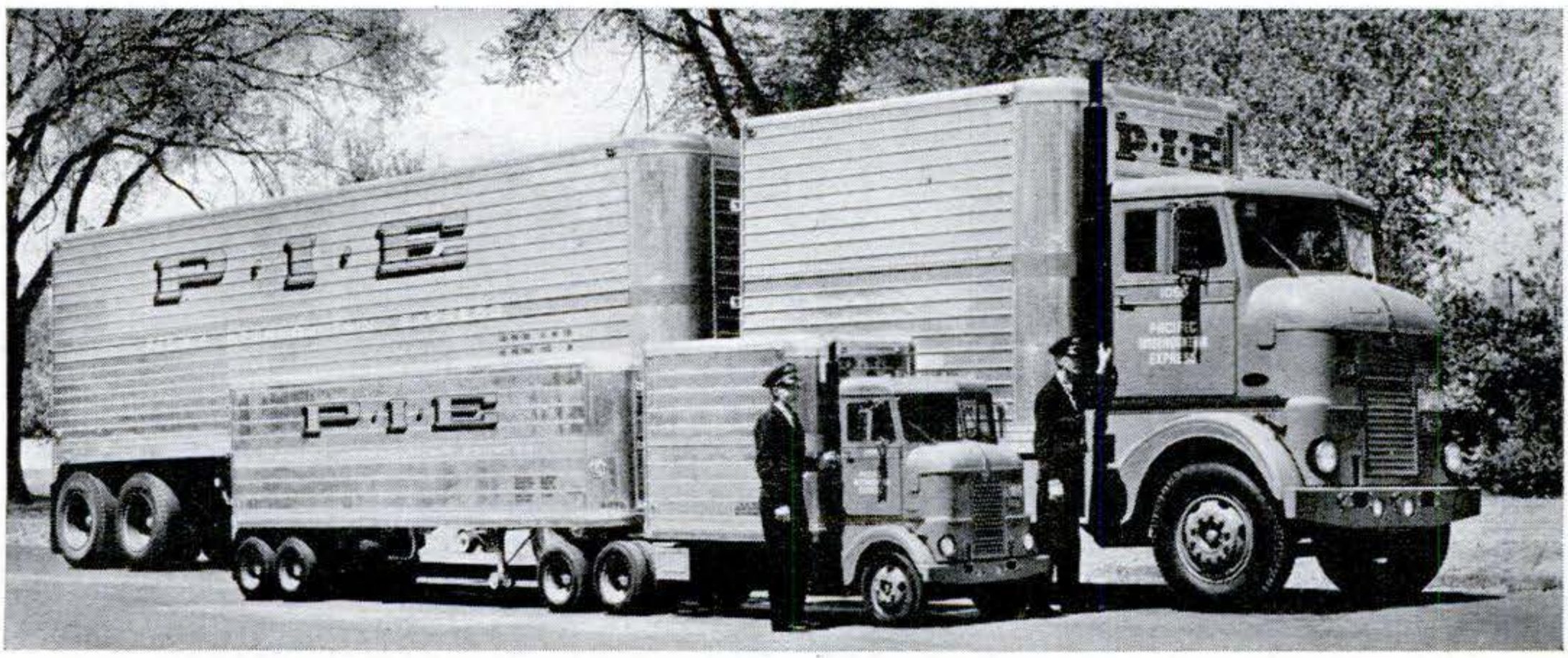
## Scrap Pile and Yank Know-How Give GIs a Mobile Stairway

THIS stairway, for loading passengers on planes, was built by GIs in Korea strictly from scrap. Lumber was salvaged from a wrecked bridge; iron to hold the treads was cut from a bombed-out hangar; pipe railing was fished from the Han river.

The steps ride from field to field semipermanently mounted on a jeep. Warrant Officer Lloyd G. Lewis sparked the Combat Cargo Command project.

## Fins Boost Ferry's Speed

THIS German boat glides along on two steel outboard fins. With bow lifted high enough to show daylight beneath, the boat meets less drag from the water, hits 48 m.p.h. A U. S. boat with fins at bow and stern (PSM, Oct. '52, p. 157) made 35 with an outboard motor.




## Baby Trailer Checks Students' Driving Skill

THIS half-size trailer rig is powered by a jeep engine. It has dual drive, two transmissions giving nine forward and three reverse speeds, and air brakes. Rolling along on midget-racer tires, it travels to high schools carrying equipment used for testing professional truck drivers.

The electronic devices are set up at the roadside, and students seated before them check vision and reflex actions. The equipment measures in split seconds how long it would take a "driver" to put on the brakes or to turn on a given signal if he were really driving for Pacific Intermountain Express.



Copyrighted material

Strange tracks are about foot long (below). Those found by British mountaineer, Dr. Ward (facing page), look like they were made by two-legged creature.

# The World's Most Mysterious

They belong to the Abominable Snowman, which may be monkey, bear—or cave man. New Everest expedition hopes to find out.

WHAT—or who—makes the naked, manlike footprints in the snow near the tops of the world's highest mountains?

The mystery, which has stumped the experts for 30 years, may be solved in 1953. Next May Britain's Royal Geographic Society, which has sponsored nearly all Himalayan exploration, is sending another expedition back to tackle Everest. These climbers hope to see and identify the mysterious creature they call the Abominable Snowman.

Ever since 1921, climbers approaching the peaks of Mount Everest and other Himalaya mountains have been startled by what look like human footprints in the snow. The prints are found four or five miles high, where the temperature is often 25 below. Yet no mountaineer has ever seen, even fleetingly, the creature that makes the tracks.

The Snowman has many names. The Himalayan natives call it Yeti, Mirka,

# Footprints

**By Gardner Soule**

# Tracks Made by Some Animals Are Like Snowman's—

**SMALL LANGUR MONKEY** has a left hind foot that makes track in wet sand like this. The print, however, is only 6⅞ inches long—five to six inches shorter than tracks on Mt. Everest.

**SMALL BEAR TRACK** shows imprint of right hind foot superimposed on print of forefoot —a phenomenon that might cause bear's trail to look like that of two-legged beast.

**ANOTHER BEAR TRACK**—of right hind foot alone—looks like this. This track was made by a black bear, not known ever to appear as high up as four miles in Himalayas.

Metchkangmi—or in pidgin English, Bad Man-shi. Different scientists have "definitely identified" it as a wolf, black bear, red mountain bear, snub-nosed monkey, langur monkey and great ape.

Among the natives there is no such variety of opinion. Several claim to have seen it. They say it is a man. A wild man covered with thick hair; a cannibal who also eats sheep, oxen and yaks. A man with an evil face, teeth like fangs, toenails like claws. A man who can jump by huge bounds and run like lightning over the mountains.

### *It's Real, All Right*

The Snowman definitely exists. The British mountaineers have photographed and measured its tracks.

The first European to report the mysterious tracks was the first Everester of them all, Lt. Col. C. K. Howard-Bury. He startled British scientists in 1921 with the news that his expedition had discovered at 21,000 feet "the track of what was probably a large, loping gray wolf, which had tracks very like those of a barefooted man."

The latest report on the Snowman comes from Eric Earle Shipton, current champion among Everest climbers, with 12 trips to the Himalayas behind him.

"I have come across many of these tracks in various parts of the Himalaya and the Karakoram," Shipton says.

Only last year on a glacier 19,000 feet high he saw the spoor. "On November 8, 1951, at four o'clock, we came upon strange tracks in the snow. What was particularly interesting was that where the tracks crossed a crevasse one could see quite clearly where the creature had jumped and used its toes to secure purchase on snow on the other side.

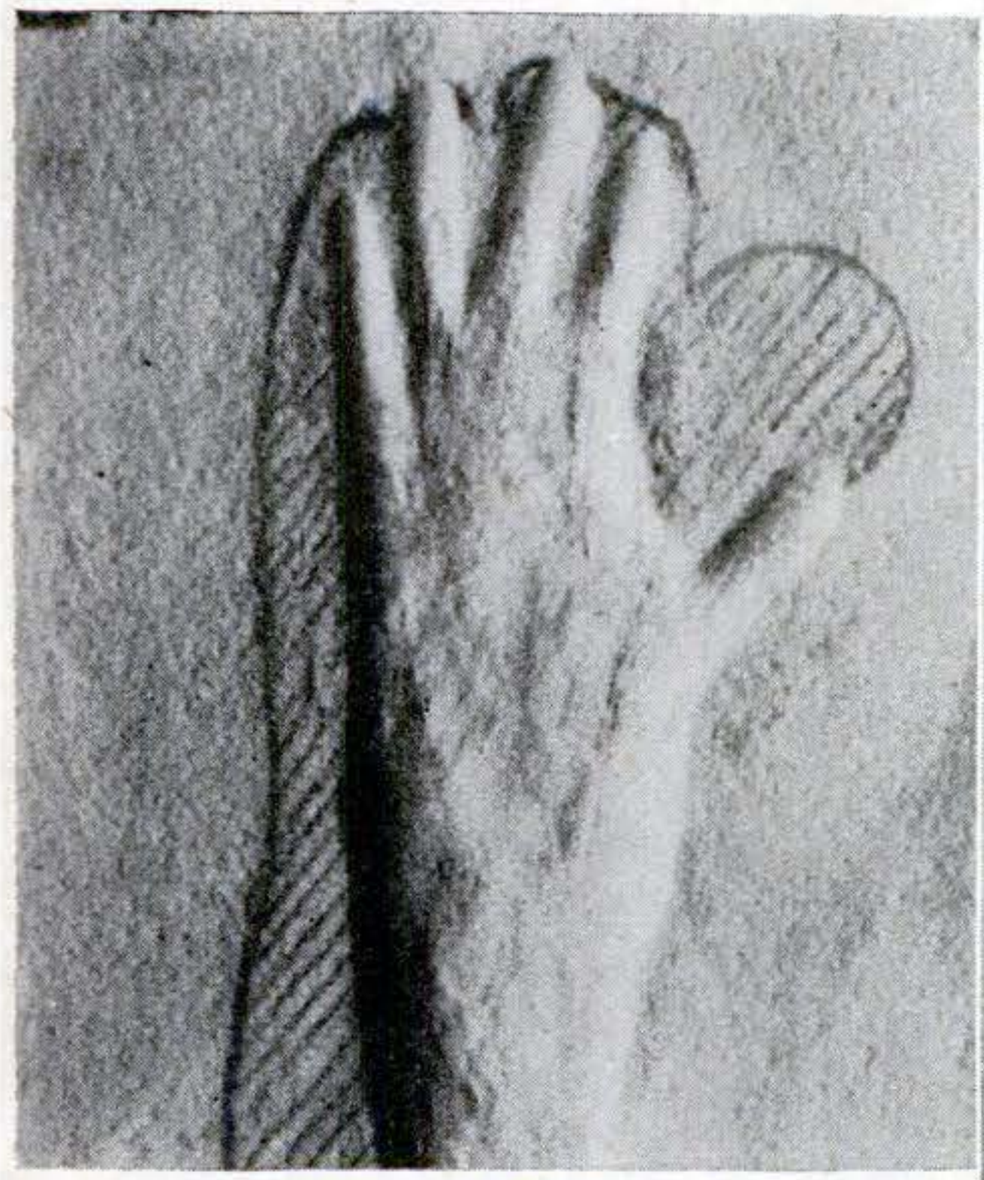
"We followed the tracks for more than a mile down the glacier before we got to the moraine- [rock-] covered ice."

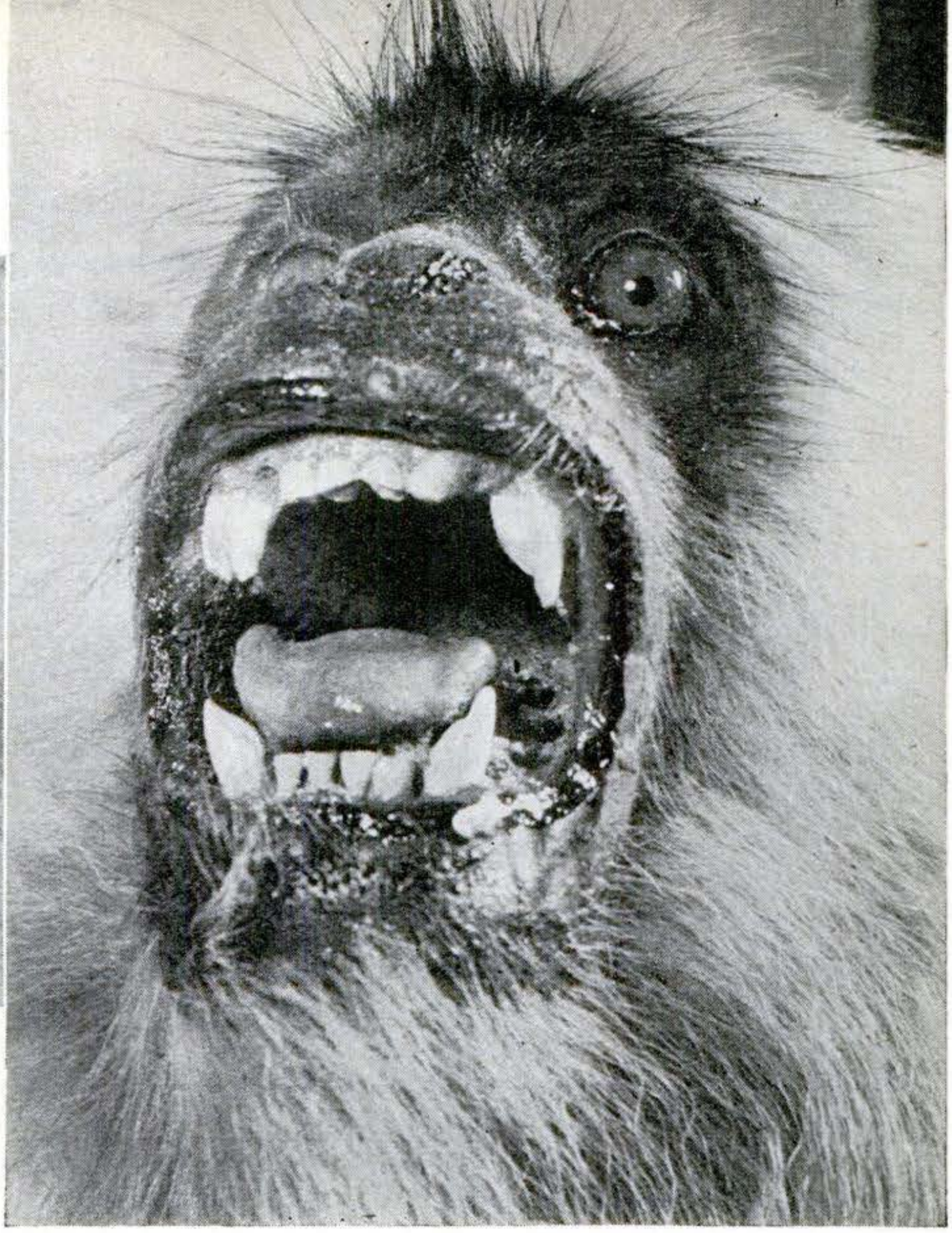
The tracks, Shipton reports, were about 12½ inches long, and broader than a mountain boot. Shipton's photographs



Copyrighted material

# But Not Exactly





**LARGER LANGUR** makes track like this plaster cast, here placed over lines resembling the mysterious tracks. The langur, never yet seen near mountaintops, is at right.

of the tracks appear with this article.

Between Howard-Bury in 1921 and Shipton in 1951, many other Everesters saw the tracks.

Frank S. Smythe came upon the tracks in the Himalayas in 1937.

"I saw the imprint of a huge, naked foot," he said, "apparently of a biped and in stride closely resembling my own tracks." The stride was 1½ to two feet long, Smythe said; the tracks 13 inches long.

### *A Talented Creature*

When Smythe followed the tracks downhill he was amazed: "An expert mountaineer could not have made a better route and to have accomplished it without an ice axe would have been both difficult and dangerous." (Difficult and dangerous is a mountaineer's phrase for the hardest kind of climb or descent.)

"Obviously," Smythe continued, "the Snowman was well qualified for membership of the Himalayan Club!"

Smythe's photographs were examined by a number of British scientists, including the famous biologist Julian Huxley. Conclusion: the tracks were made by a bear. The fact that they appeared to be made by a biped was explained by the bear's putting its rear feet into the rear ends of the impressions left by its front feet.

Eric Shipton also saw the tracks in 1937 elsewhere in the Himalayas.

"The tracks I saw were certainly not bear tracks. They were all in one line and not staggered right or left of a central axis, as in the case of four-legged creatures."

After Shipton's 1951 report of the tracks got back to London, the world-famous London Zoo trotted out some Himalayan bears and monkeys and had them make tracks in wet sand.

The snub-nosed monkey, however, appeared to be too light to break the snow and make the tracks. The bear tracks were not the right size; besides bears



Copyrighted material

are seldom seen outside of the valleys.

That left the langur monkey. Shipton answered this one: "The tracks measured rather more than 12 inches, which would suggest that they had been made by a creature larger than any langur known.

"I understand that langur monkeys are vegetarians. Now while a carnivorous creature might feed upon marmots and tailless Tibetan rats which inhabit the lower reaches of these glaciers . . . a vegetarian, other than a grazing animal, would in these parts be very far from adequate food supplies.

"What in any case is a monkey doing in these regions of permanent snow?"

What about an ape? Most apes live in tropical forests in flat regions. There is, however, a mountain gorilla. The trouble is he lives 5,000 miles from Everest in the Belgian Congo.

### *Eyewitnesses Agree*

There are records of two Europeans —neither one a Himalayan mountaineer —who assert they saw the Snowman. They agree with the natives.

Stanley Snaith, in his book *At Grips with Everest,* tells about the first:

"Years before the Everest expeditions a traveler (in Tibet) named Hugh Knight told of a strange being he had encountered on a mountain slope: a creature with a face of a Mongoloid cast, splay-footed (that is, with feet that are flattened or spread out), with the crouched shoulders and thick mane of a gorilla, leaping with marvelous sureness from rock to rock. It carried a primitive bow."

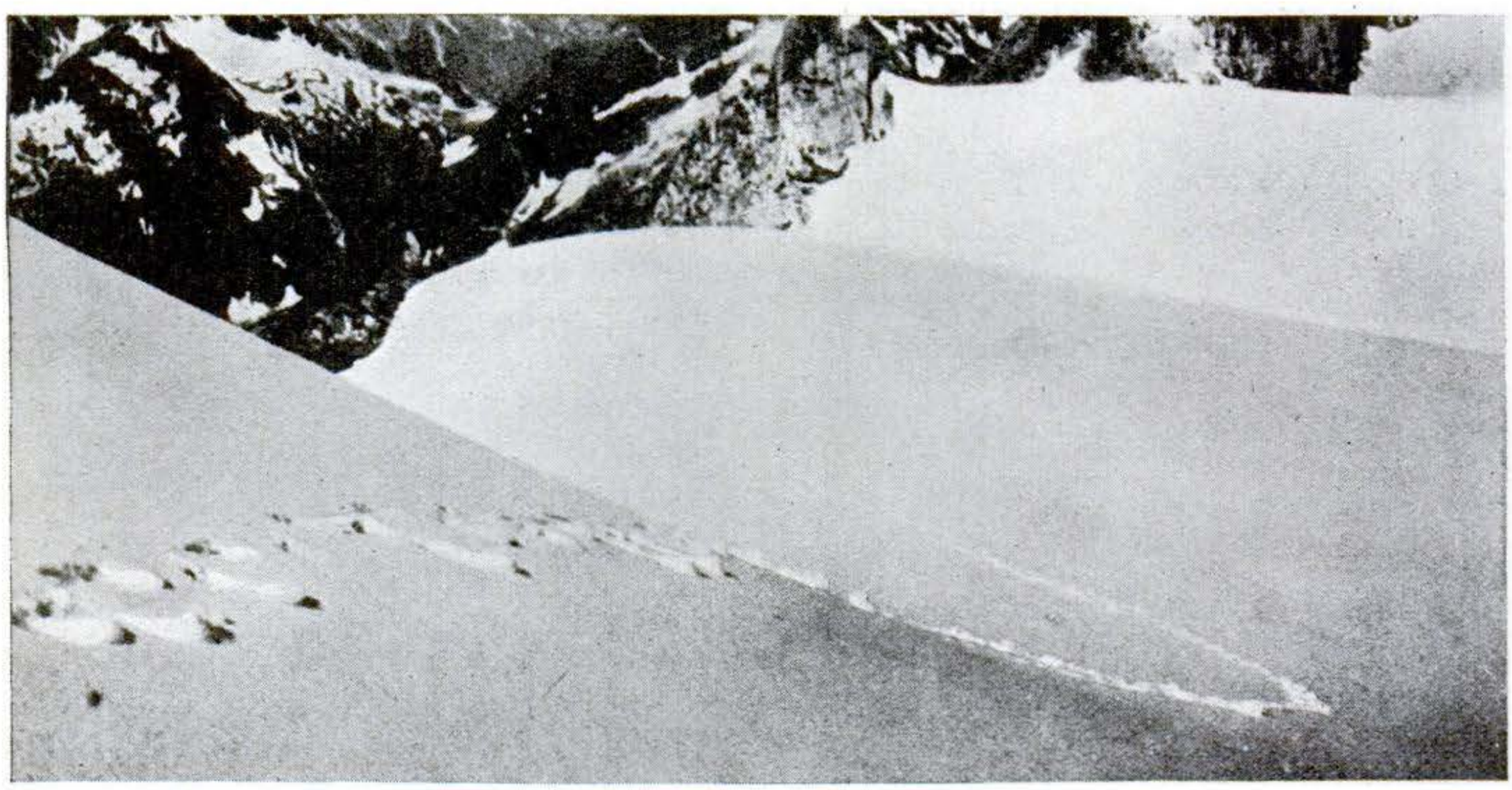
### *Native Expert Saw One*

Frank MacIntyre, in his book *Attack on Everest,* tells of the other:

"An Italian named Tambazi claimed encounter with the Troglodyte . . . Near the Kabur mountain, he said he saw a wild man . . . moving swiftly on the mountain side. He examined it through powerful glasses, saw that it was man-like, walking upright, naked, covered with hair; stooping occasionally to tear up roots." Tambazi found a footprint. It was like that of a man, and spread outward at the toes.

The most authentic native report comes from a Sherpa named Sen Tensing, a Himalayan porter so famous for his reliability that last May he was allowed to accompany the Swiss climber Raymond Lambert all the way up to 792 feet from the summit of Everest—the highest point mountaineers have successfully reached.

[Continued on page 242]



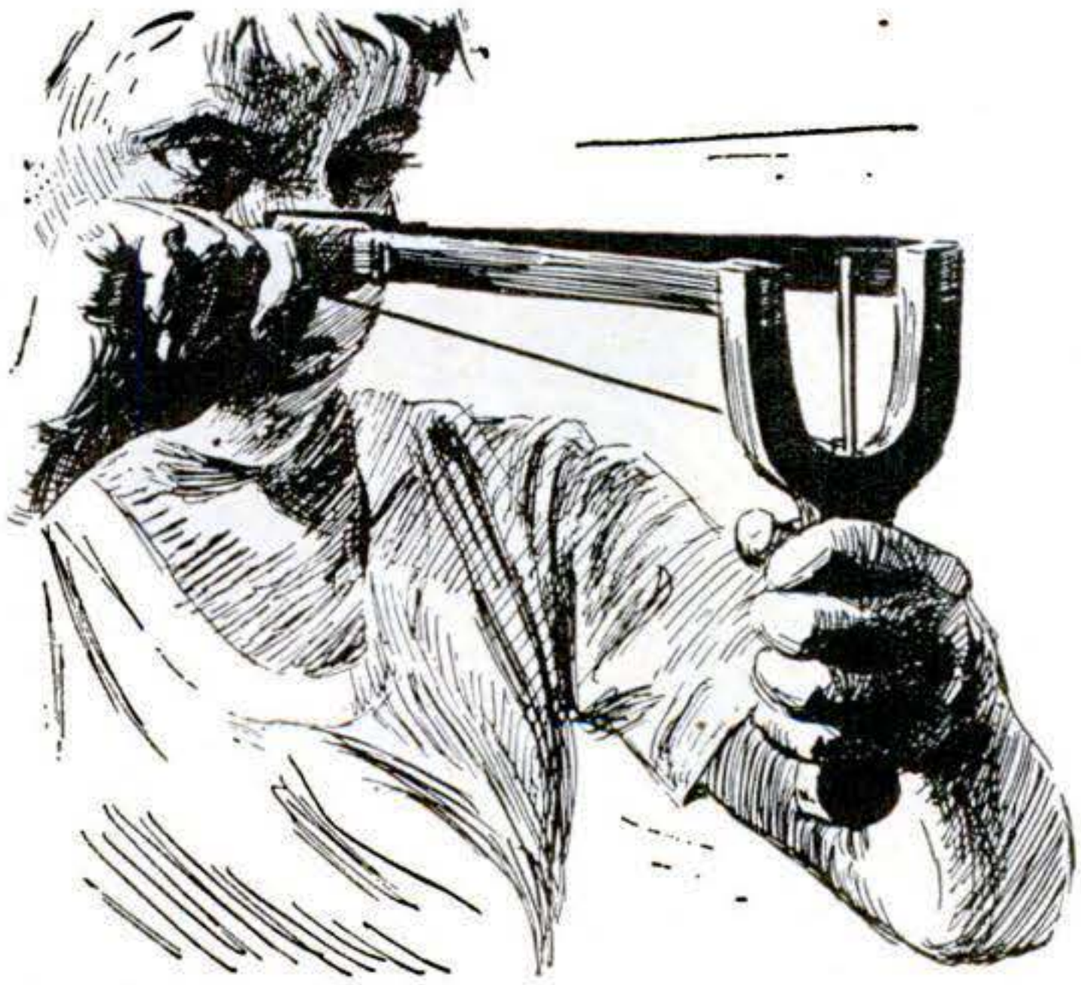
**MOST PUZZLING PHOTO of all, taken in 1937, shows that Abominable Snowman made an excellent descent down treacherous slope. This would be a feat for experienced mountaineer.**



Copyrighted material

# New Ideas from the Inventors

**1 "Flippers" to Stabilize Plane.** Here may be a preview of a coming style for big aircraft. Ahead of the main wings would be these stubby ones, pivoting freely on a common shaft and adjustable by trim tabs. They would help maintain balance and lift when main-wing flaps are extended for landings and take-offs, and could be retracted at other times. The inventor is the head of a leading aircraft-building firm.



**2 Sight to Aim Slingshot.** Youngsters would use an automatic sight to aim a slingshot of this improved design. When a missile was placed in the elastic band and drawn back, a pull-string would raise a central rod into position for sighting at a target. Upon release of the missile, the rod would automatically drop out of its way.

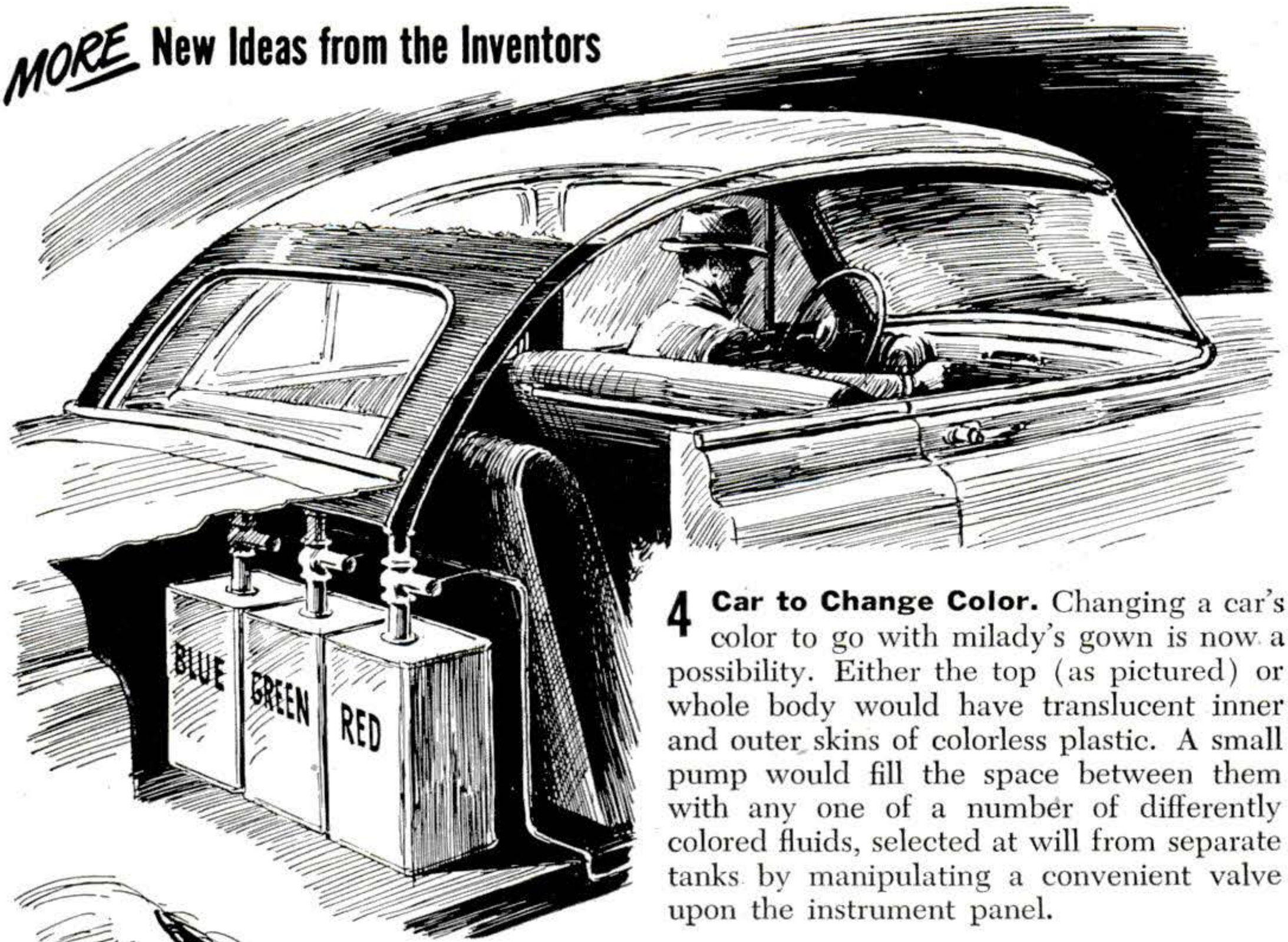
**3 Hammer to Prevent Rebounding.** Heavy blows with this hammer wouldn't cause it to bounce back. Nearly filling the hollow head, loose and irregularly shaped particles of hard steel or brass would make up its weight. Upon impact, the inventor says, they would pile up and deliver a recoilless and prolonged blow.

***Please turn the page for more new ideas.***



Copyrighted material

# MORE New Ideas from the Inventors




**4 Car to Change Color.** Changing a car's color to go with milady's gown is now a possibility. Either the top (as pictured) or whole body would have translucent inner and outer skins of colorless plastic. A small pump would fill the space between them with any one of a number of differently colored fluids, selected at will from separate tanks by manipulating a convenient valve upon the instrument panel.

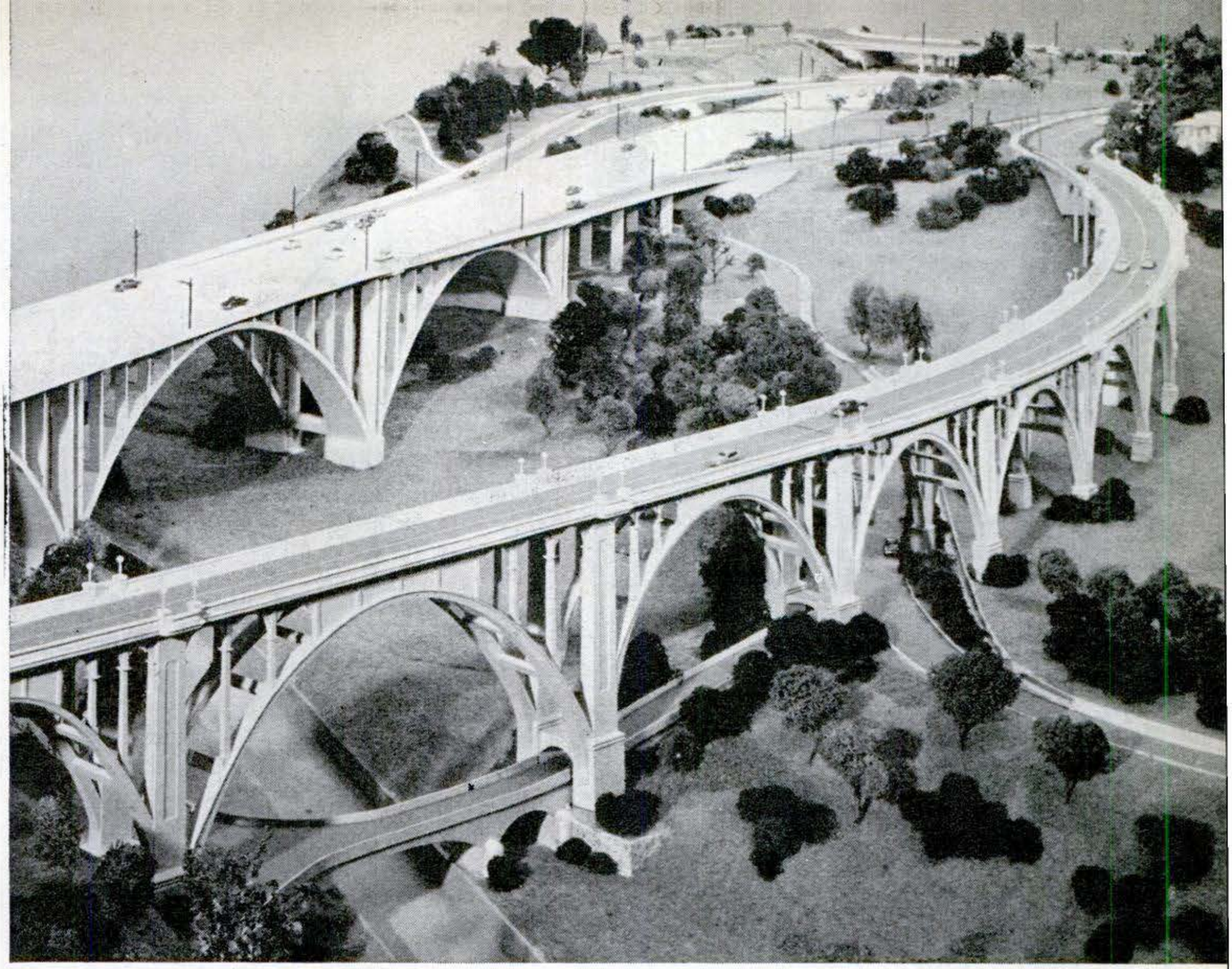
**5 Pad to Contain Instant Inhalant.** Dip this packet in water for 10 seconds, place it on a plate, and it would emit a vapor to be inhaled for treating a cold. No boiling water would be needed. Instantly ready for use, the packet would contain chemicals that interact when wet and liberate heat.

**6 Bell to Ring on Christmas Tree.** Designed to add tinkling sound to a Christmas tree, this invention combines a tiny bell with a solenoid-operated plunger and cord to swing and ring it. It would include a flasher to keep the bell swinging, and could fit a Christmas-tree-lamp socket.

*Patents on these inventions have been granted to: 1. Donald W. Douglas, Santa Monica, Calif.; 2. Willis O. Fernsel, Los Angeles; 3. Johannes W. Kahlen, West Vancouver, B. C.; 4. Harry L. Lacy, Philadelphia, and Mount L. Lacy, Dundalk, Md.; 5. Austin P. J. O'Grady, Lindfield, N. S. W., Australia; 6. Edwin J. Nicorvo, Morgan, N. J.*



Copyrighted material



Model shows two huge concrete bridges that will help to straighten out Los Angeles traffic.

# Los Angeles Prepares for More Traffic

***With the densest car population of any large city in the world, it is spectacularly building a way out of present and future jams.***

**By Wesley S. Griswold**

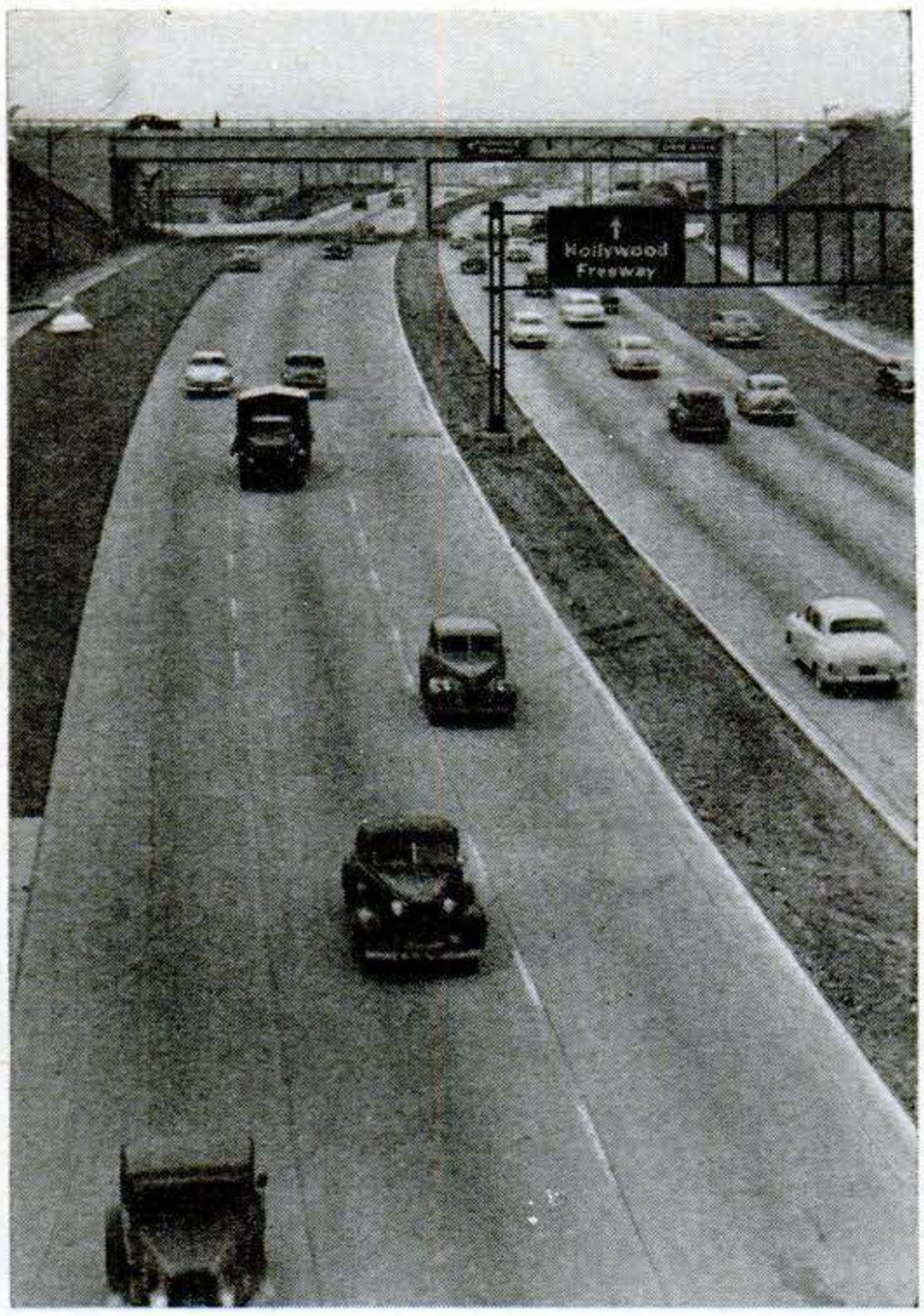
LOS ANGELES has grown up with the automobile. Now it is showing all other large cities how to avoid being strangled by traffic.

The people of Los Angeles own 2,000,000 cars—one for every two of them. To avoid the world's biggest traffic jams, city planners realized several years ago that they had to do something drastic. In 1946 road engineers designed a spectacular network of speedways that would enable heavy traffic to move quickly across the city's 452 square miles and would take care of all the cars the future was likely to bring to town.

Thirty miles of those roads, which at one interchange are stacked four deep, are now in use, carrying more than 200,000



Copyrighted material




**TEN-FOOT STRIP divides the four-lane, one-way halves of the Hollywood Freeway. In addition, black-topped, six-foot parking strips are provided for drivers that run into car trouble.**

cars a day. Already the improvement in traffic conditions is striking. Seventy additional miles of speedway are being built. Eventually five major and 23 feeder roads will be constructed, at a cost of $2,000,000,000. By then, if you visit Los Angeles, you will be able to whiz over a superhighway system 613 miles long, through 60 towns spread over an area as big as Rhode Island. State and city governments are working together on this monumental project, and gas taxes are paying the bill.

### *Congestion Is Dropping Off*

Even during peak hours, traffic moves along the freeways at speeds between 40 and 45 miles an hour. On parallel city streets it crawls at 10 to 22 miles an hour. But congestion on those streets is fading fast. Traffic volume has dropped 50 percent on Temple Street, formerly a main east-west artery. It is down 40 percent on Sunset Boulevard, 22 percent on Olympic Boulevard, 16 percent on Wilshire Boulevard.

Another dramatic benefit that the freeways have brought to Los Angeles is greater safety for motorists. Last year only one person was killed on the new speedways for every eight who died in accidents on city streets where the traffic was comparably heavy.

Nearly $200,000,000 has been spent or earmarked for the road construction that is altering the face and stepping up the pace of the city. A lot of that money was spent before a foot of roadway could be built. It went for such items as moving 3,513 buildings, demolishing 262. Property owners along the Hollywood Freeway alone were paid $27,000,000 for their homes and other buildings. Construction costs on the same eight-mile stretch added $28,000,000 to the bill.

### *Razed the Area*

Probably the most expensive half-mile of road in the world was the short section of the Hollywood Freeway that runs through the city's Civic Center. It cost $5,500,000, double the average cost for such a distance.

At this point, crews of workmen cut down Fort Moore Hill, destroying a pair of railway and vehicular tunnels in the process. They wrecked a school building. They tore down dozens of apartment houses and stores. They relocated miles of gas pipes, underground telephone lines and water pipes. Over a 15-acre area they then proceeded to spread the octopus-like structure that weaves four speedways together at that spot.

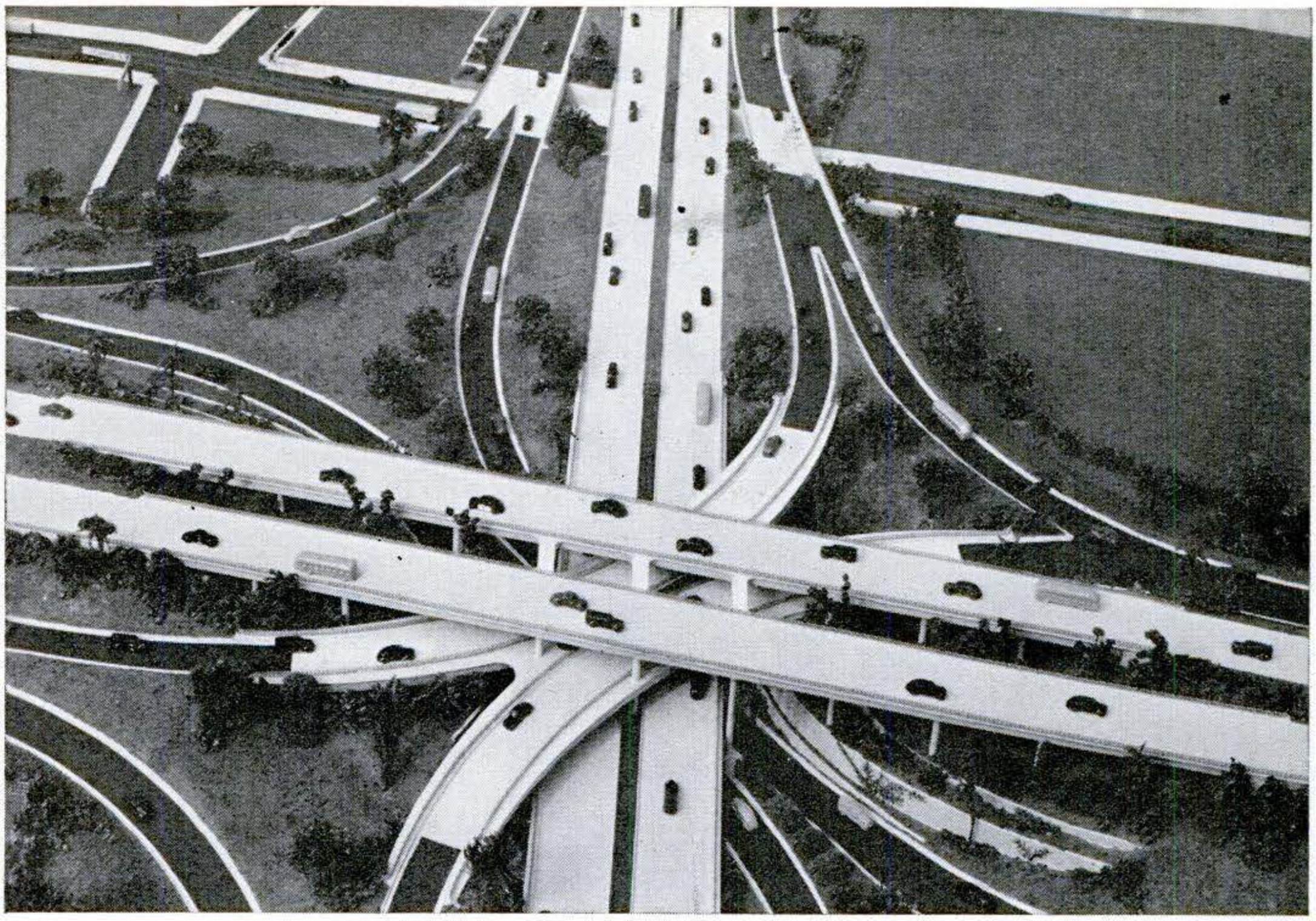
### *Dump Trucks Build Mountain*

Road builders cut down hills and fill ravines, hoping that the two will cancel out each other. It didn't work that way along the Hollywood Freeway and the downtown section of the road network. There were more hills than valleys.

Dump trucks began to haul dirt away from the freeway routes six years ago. They've been at it day and night ever since. At first, they simply dumped the stuff down a canyon on Bishop Road, barely a mile from the Civic Center. The canyon filled up. A small mountain took its place. It is more than 100 feet high now, 400 feet wide, 1,500 feet long. More than 500,000 loads of dirt have been dumped on that mammoth pile. Grass and eucalyptus trees have taken root and thrive on the slopes. How big the mountain will become before Los Angeles has finally licked its traffic problems, no one knows.

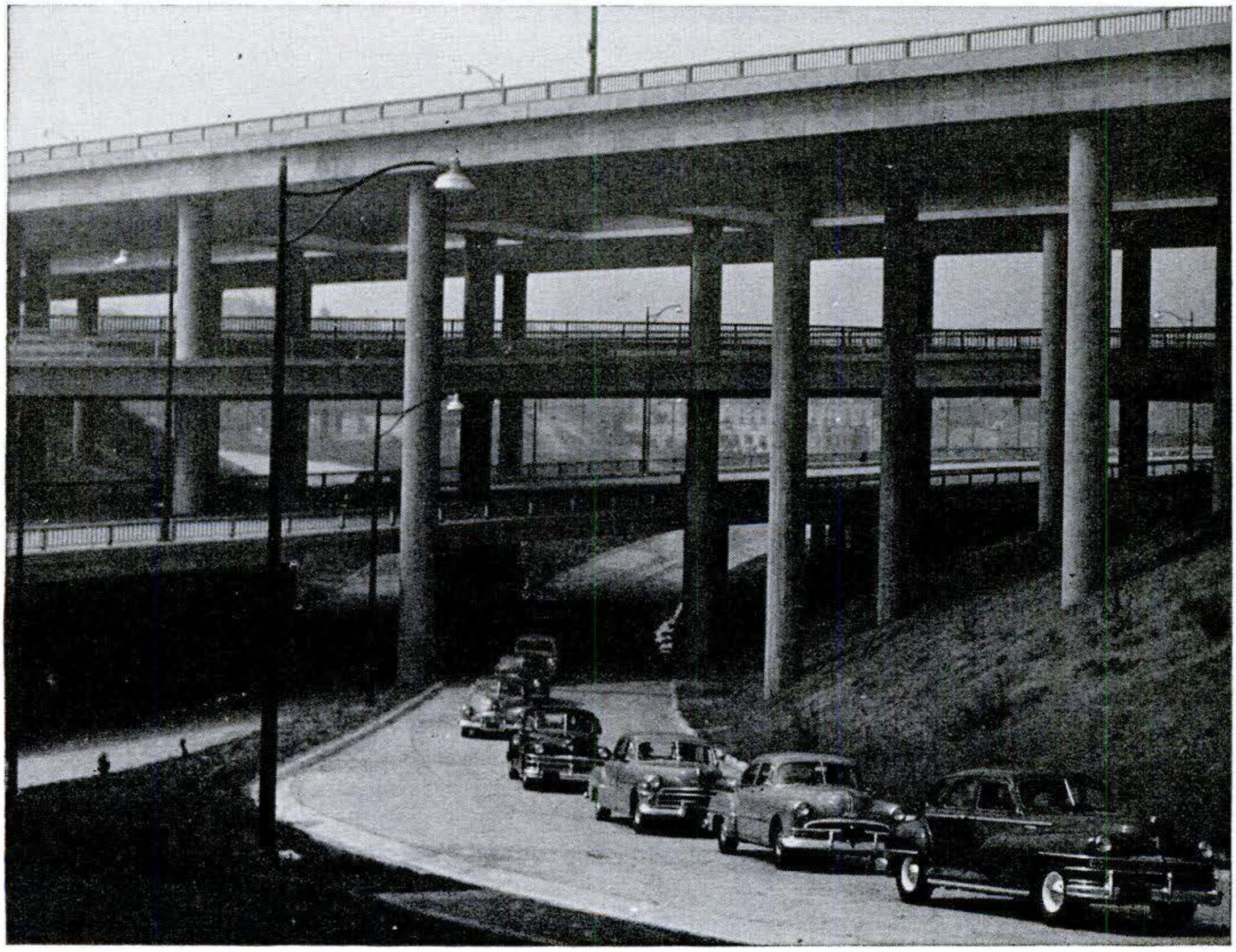


Copyrighted material



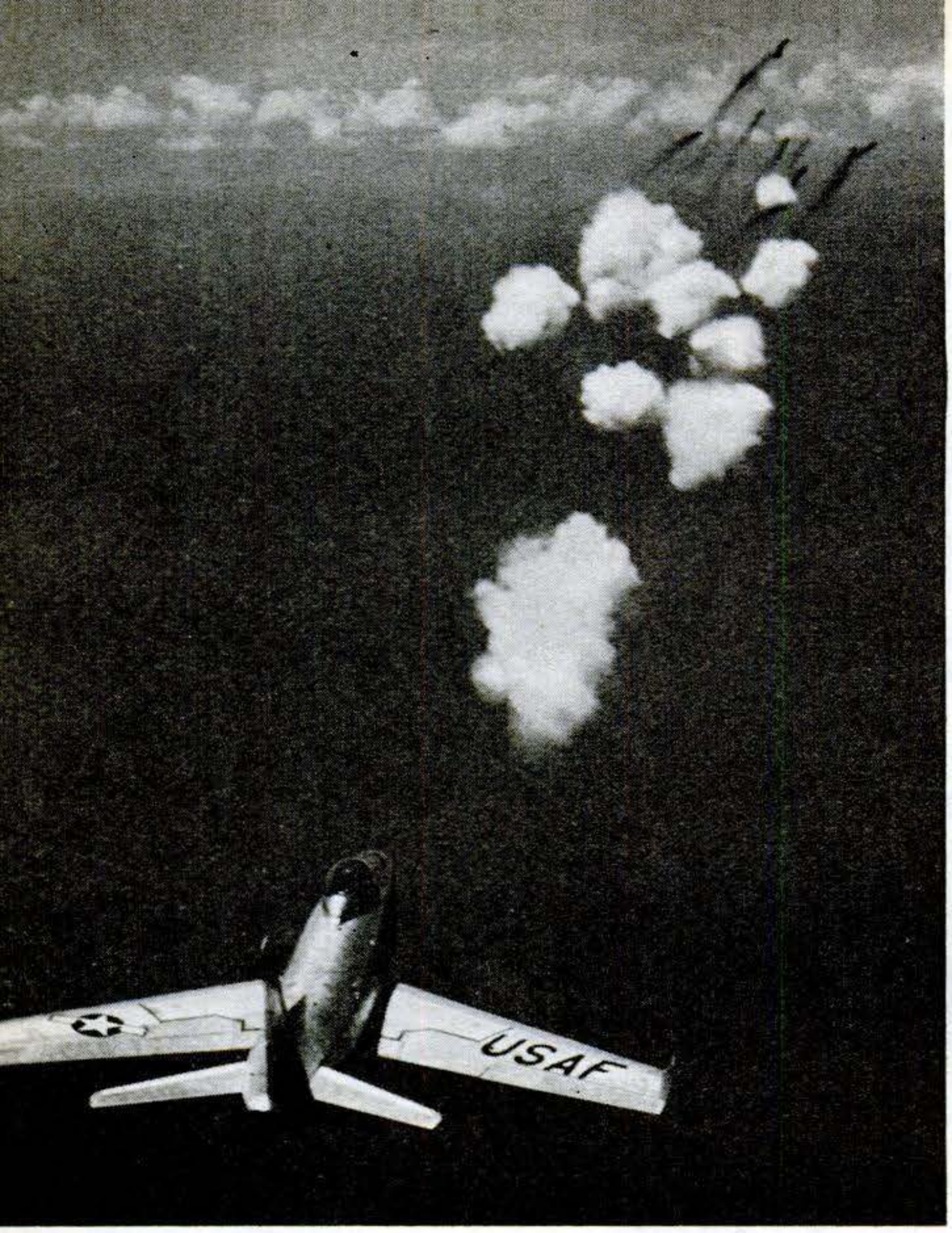
**MORE THAN 320,000 CARS** a day will eventually use the knotty-looking interchange of highways of which this is a model (above). The structure covers 15 acres and cost $5,500,000.

**FOUR LEVELS OF TRAFFIC** are provided for in the interchange (below). Top and third decks are for four freeways. Second and bottom ones are for local traffic and access to the freeways.





Copyrighted material



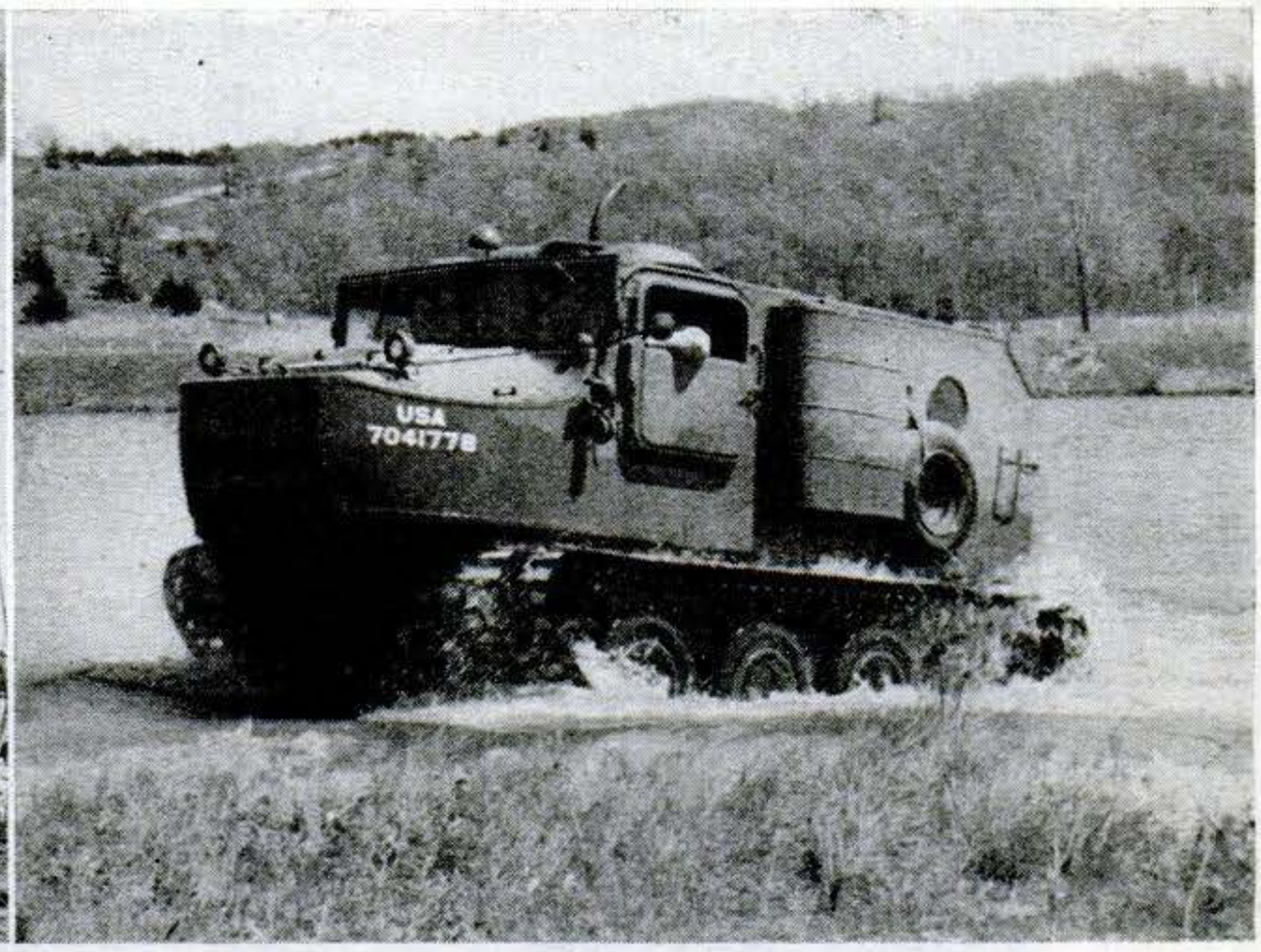

## Newest Sabre Is One-Man Rocket Ship

ON DAILY attack runs on B-17 drones, the nation's first one-man, all-rocket, all-weather interceptor is proving it can find and knock down high-flying bombers. It's the D series North American Sabre shown firing a salvo at left.

A pilot flying the D handles two jobs with an assist from electronic gear. Guided by ground control toward an intruding bomber, and flown by automatic pilot into the target area, the pilot is free to serve as radar operator and observer. Once within lethal range, little black boxes steer the interceptor and fire the 24 rockets.

The rockets fly outward in pairs at thousandth-second intervals. Where the new Sabre houses them has not been disclosed.

Cameras in both the interceptor and the drones record the flight of the rockets.




## Army's New Baby—Weight 4½ Tons—Can Swim or Crawl

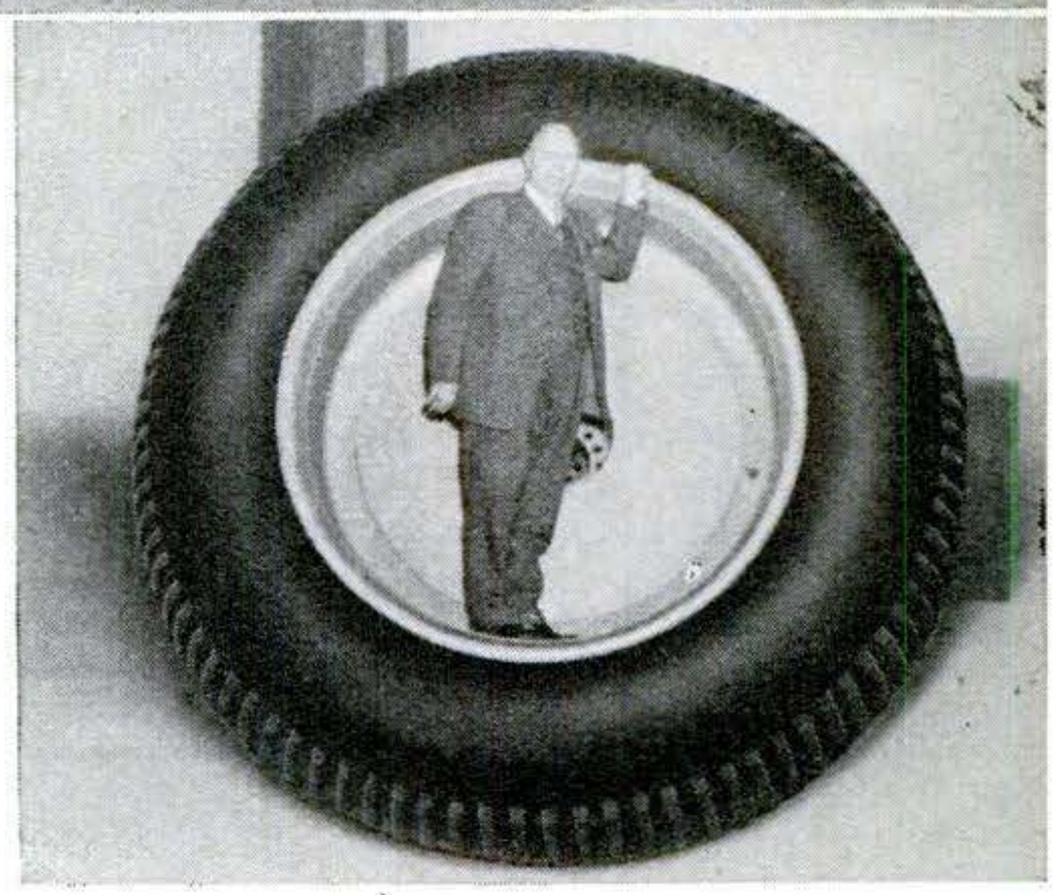
HERE'S the Army's newest vehicle—the Otter. A giant amphibious cargo carrier, it is more than 16 feet long, more than seven feet wide. It weighs 9,000 pounds and can haul a payload that adds 3,000 pounds more. Powered by a 134-horsepower, air-cooled engine, it scuttles over rough terrain, mud or snow at 35 miles an hour. Its 29-inch-wide tracks bear down on the ground with a pressure of a half-pound per square inch. Faced with a stream, the Otter wades in with stern propeller churning and makes for the opposite bank at eight miles an hour. General Motors worked with Army Ordnance experts designing the carrier, and Continental Motors built the power plant.

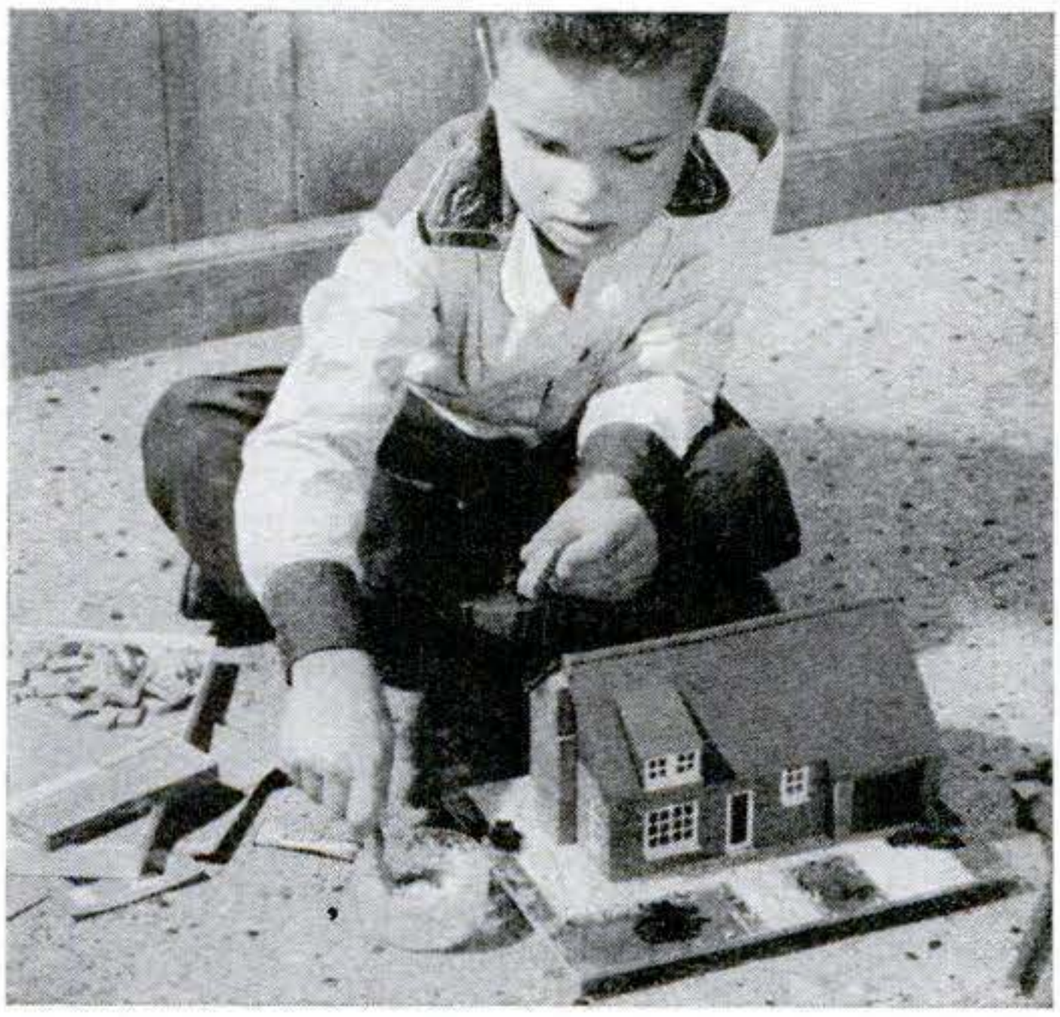


Copyrighted material

## Largest Tire Supports 8 Tons

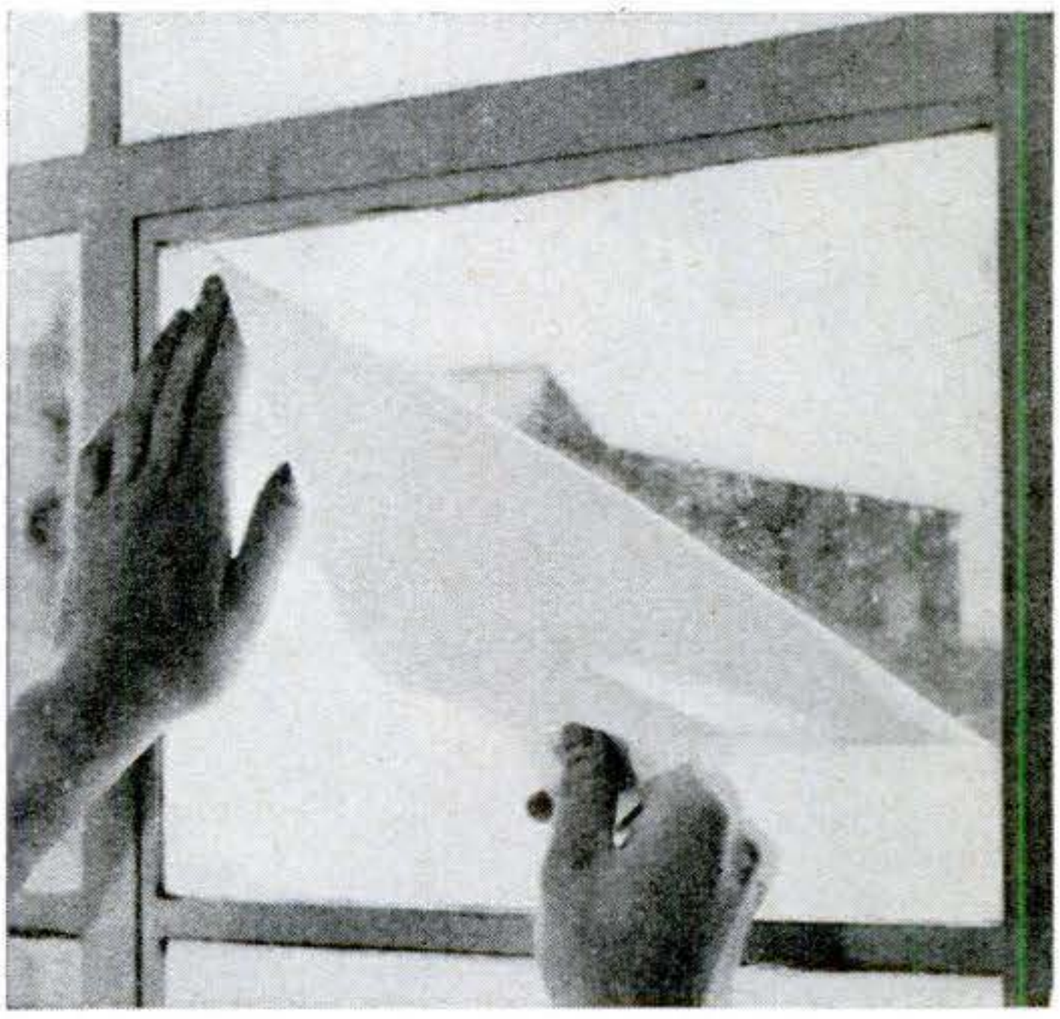
BIG enough to hold a man standing within its inside rim (right), this tire is 10 feet high and four feet wide. For use on a new swamp buggy, it is shown above under test on an earth mover. The tubeless tire weighs 1,482 pounds and supports 17,500 pounds at 20 miles an hour. It rides on less than half the air pressure required by your car's tires because it is mounted on a low-flange, wedge-type wheel designed for the rig by R. G. LeTourneau. The wheel also makes it possible to change one of these Firestone 48 by 68s in the field with few tools.





## Building Kit Has Real Bricks

JOHNNIE becomes a bricklayer when he plays with this building kit. It has real bricks that can be used over and over again: just soak a building in water and the mortar softens. The kit also contains beams, roofing, door and window frames. An English toy, Bricklayer kits are sold by J. W. Spear & Sons, 220 Fifth Ave., NYC, for $5 and $10.



## Plastic Shade Cuts Glare

YOU get sunlight but no glare when windows are fitted with this new kind of plastic shade. Pressed in place over wet glass, it clings tightly even when washed but it can be peeled off for reuse elsewhere. Shades are cut to order from white translucent, colored or "blackout black" Vinylite by Transeal, Ltd., Plainfield, N. J.



Copyrighted material

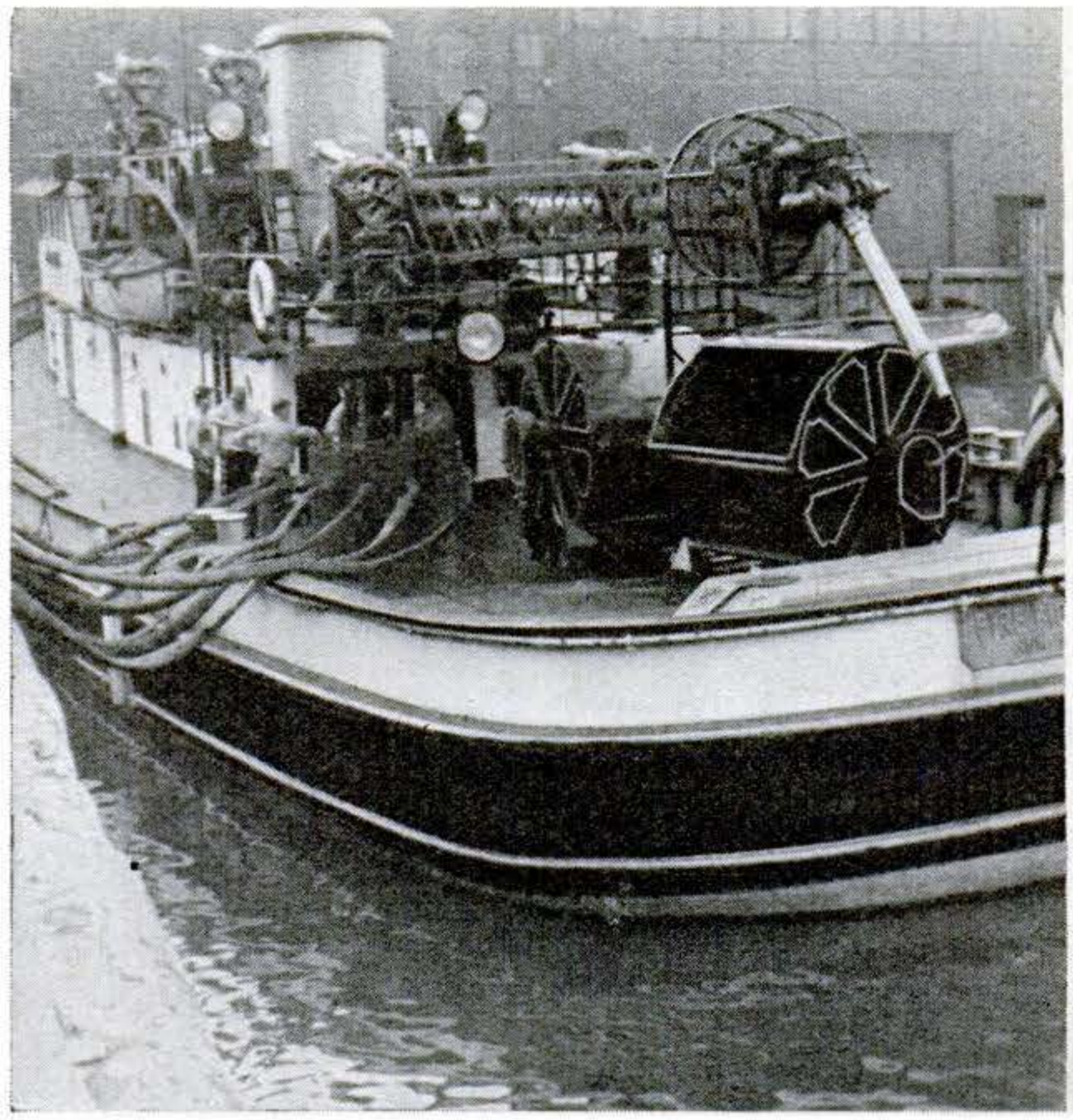
# Mobile Pipeline to Fight A-Fires

FLAMES sweep an A-bombed U. S. city. Water mains are blasted and broken. But fire fighters are far from helpless.

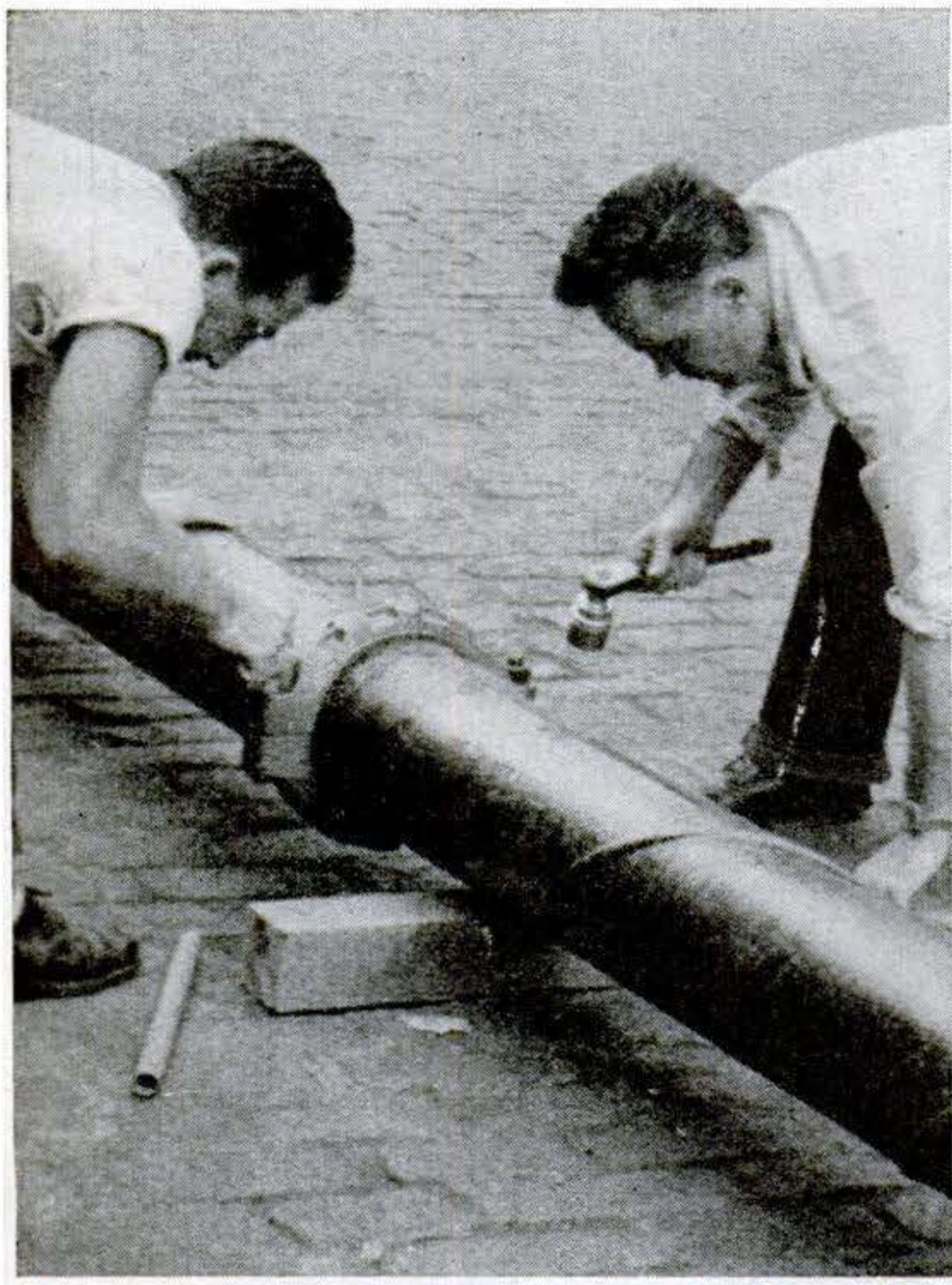
From trucks racing through passable streets, lightweight steel pipes clang to the pavement. Quick-acting couplings join them. In minutes' time, an emergency pipeline from a river, lake or reservoir brings water to firemen's hoses.

To prepare cities to carry out this plan, the Federal Civil Defense Administration is stockpiling 450 miles of special pipe this year at 36 key points.

Developed by the Victaulic Co. of America, Union, N. J., the system gets a successful New York tryout in the photos on this and the facing page.



**1 CITY FIREBOAT pumps Hudson River water through hoses to emergency pipeline ashore in New York demonstration of how fire would be fought if air raid knocked out water mains.**



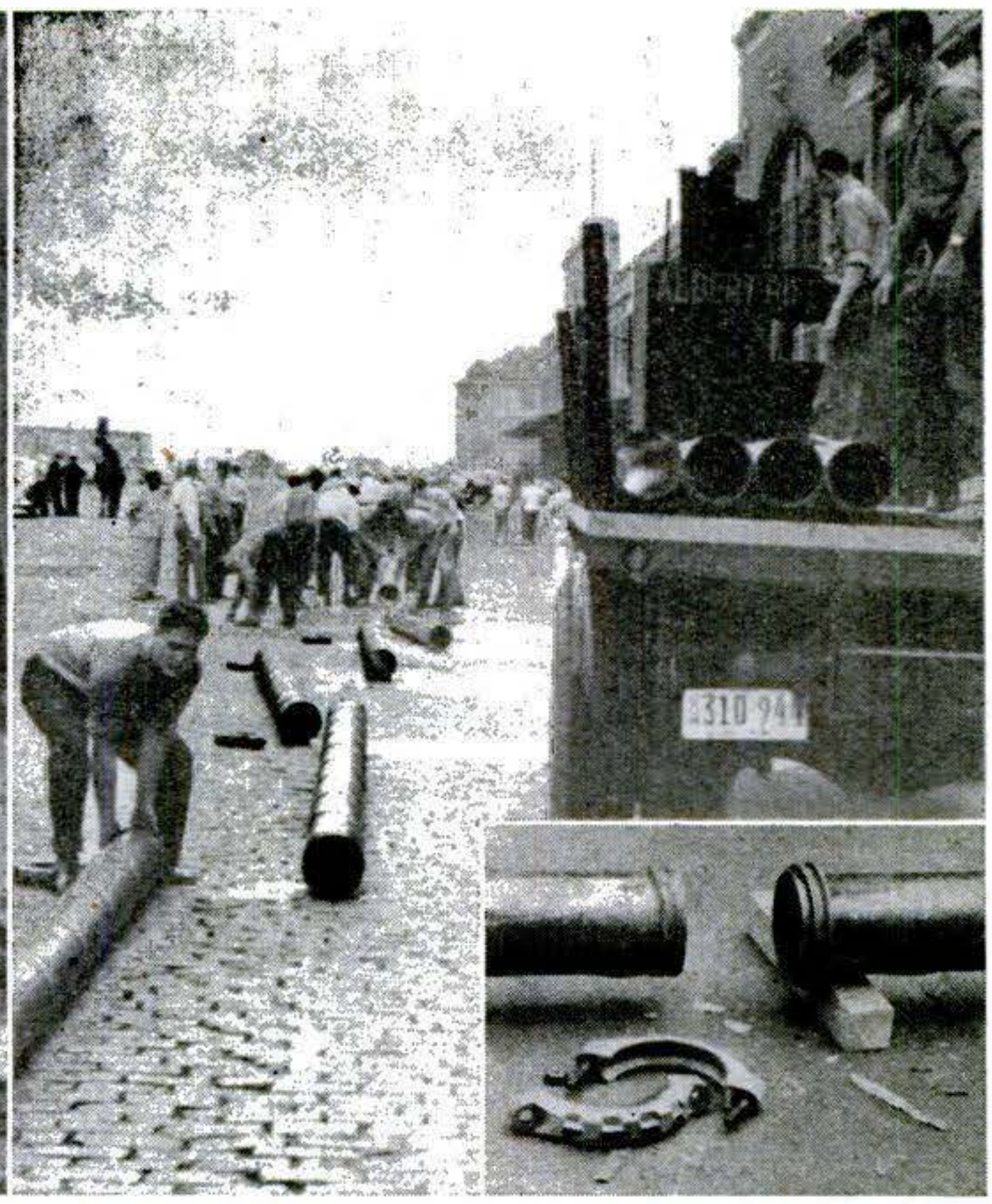
**4 QUICK-ACTING COUPLING makes leakproof joint in less than half-minute. Socket wrenches speedily tighten two nuts and bolts to assemble halves of malleable-iron fitting.**

**5 THOUSAND-FOOT PIPELINE has been laid by cadet firemen, unfamiliar with equipment, in less than 20 minutes. It delivers 3,000 gallons of water a minute to fight a blaze.**

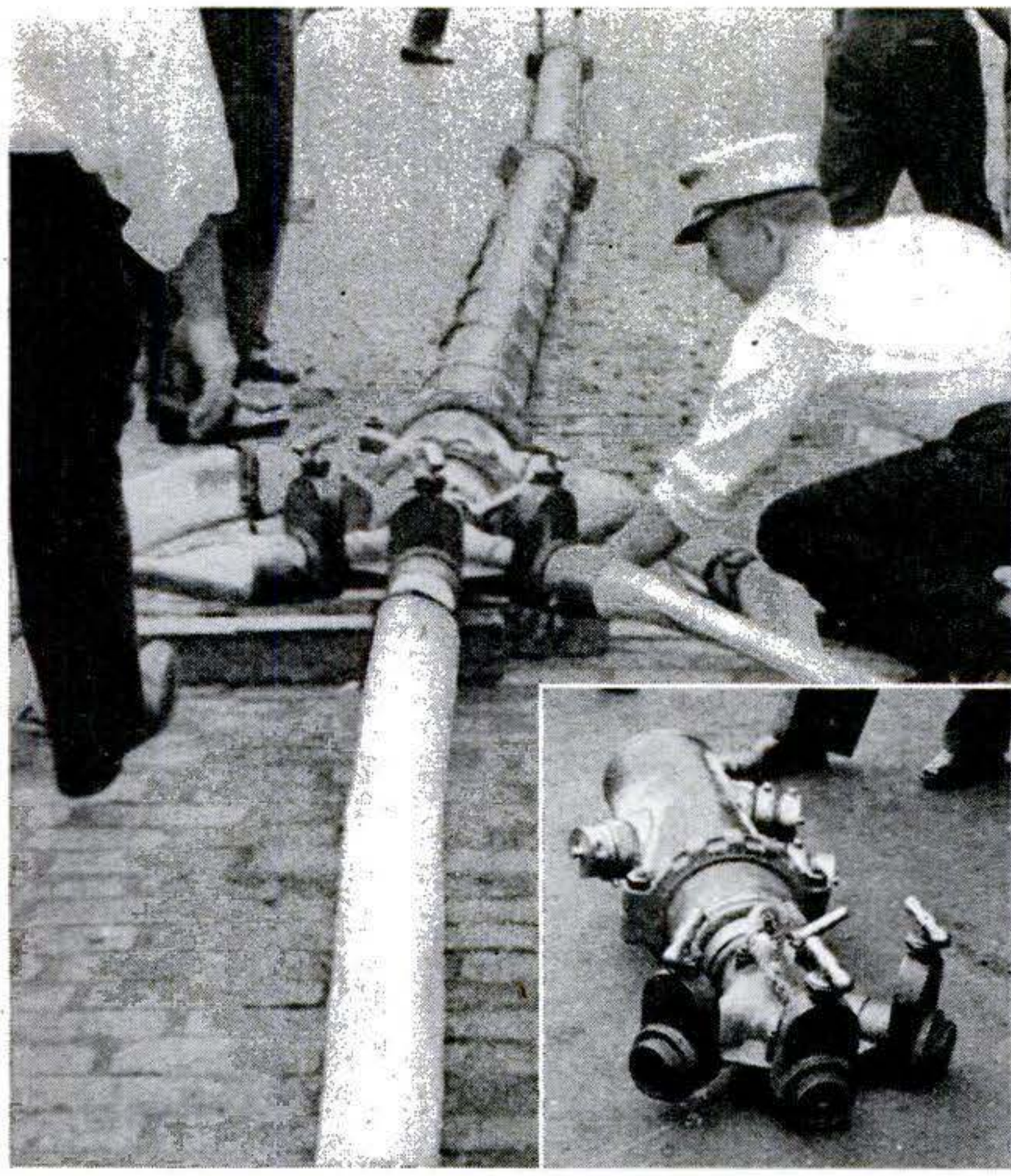


Copyrighted material

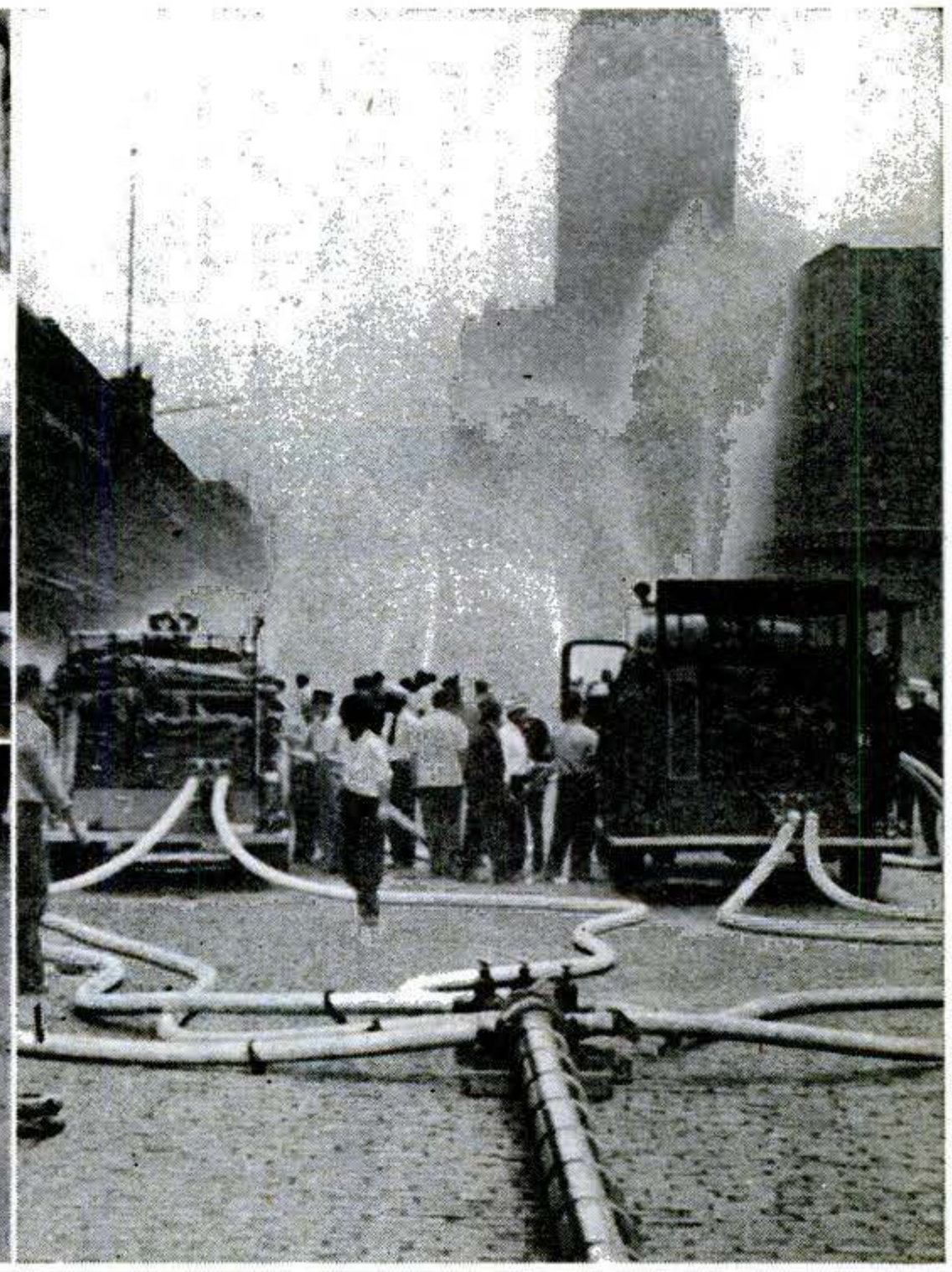
**2 TO FUNNEL STREAMS** of fireboat's hoses into pipeline, this Loftus collector is readied to be fastened to intake end. Fitting is named after New York fire chief who invented it.



**3 TRUCKS ROLL,** laying special steel pipe in 20-foot sections. To lock grooved ends together, two-piece ring-shaped Victaulic coupling (inset) clamps over a rubber gasket.



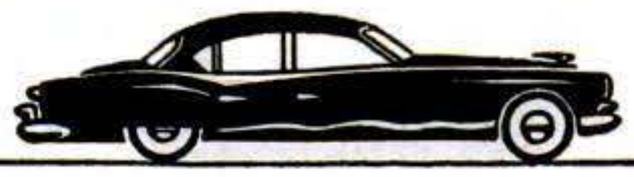
**6 AT DELIVERY END,** pumpers' intake hoses are connected to multiple-gate hose take-off (inset). Escaping air makes screaming whistles of fire-hose nozzles as water starts coming.



**7 FIRE HOSES IN ACTION,** fed by pipeline, hurl forceful 80-pound-pressure streams at imaginary flames. Walkie-talkie sets coordinate crews' teamwork all along the way. END



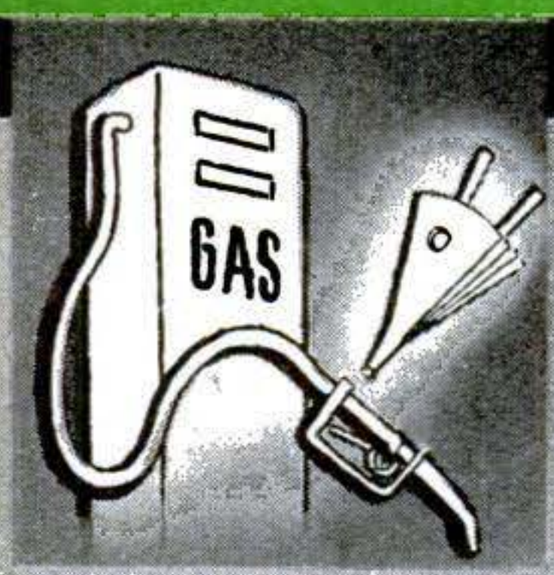
Copyrighted material



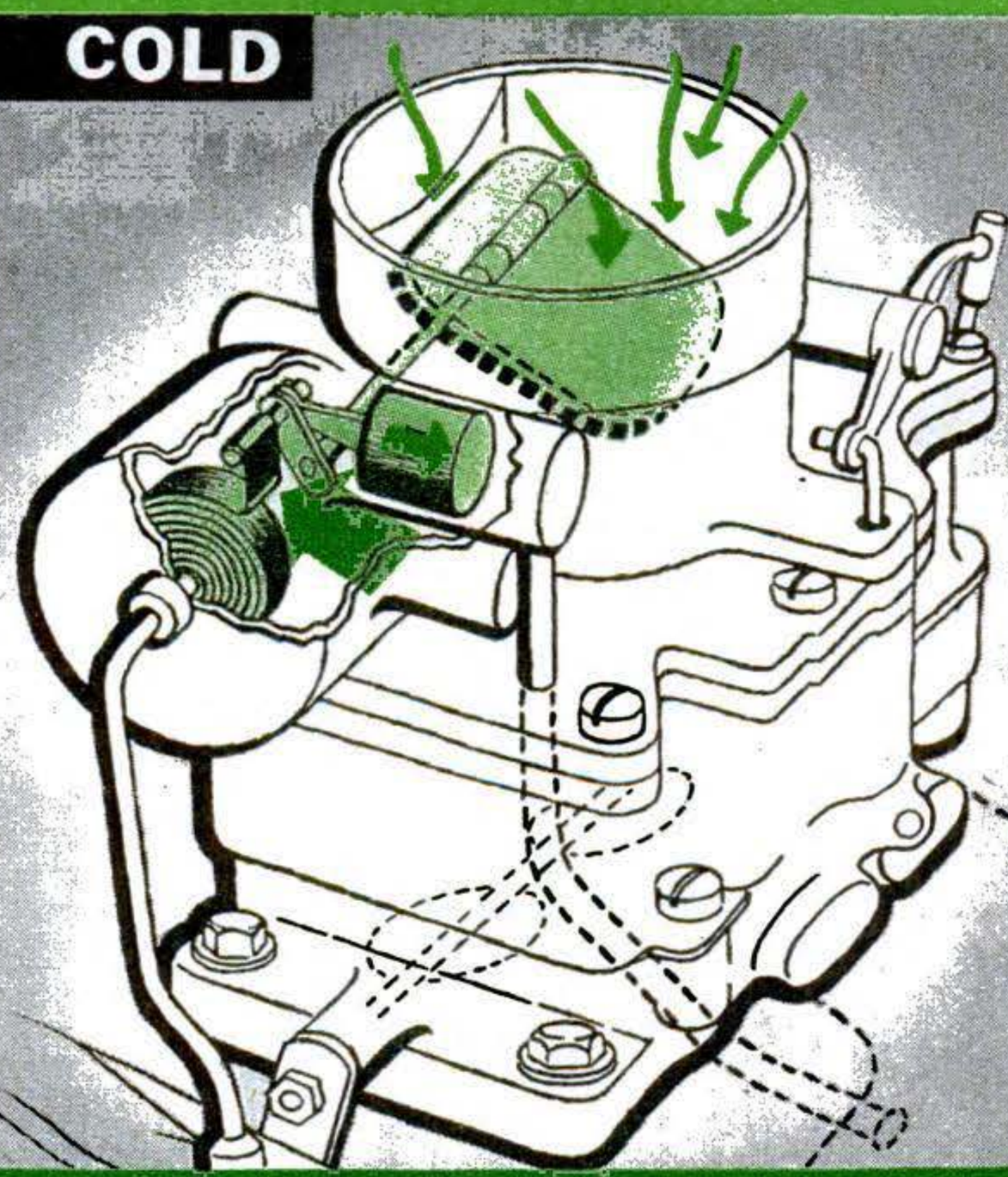
# How Automatic Choke Works

THERE are several types of automatic chokes, but they all have one thing in common: a bimetal thermostat spring to control the choke valve. In some models, the thermostat is heated by an electric coil. In most, it is heated by manifold heat, as shown below. Particular mechanism illustrated here is the one Buick uses.

## COLD




It takes a lot of fuel, little air, to start a cold engine.

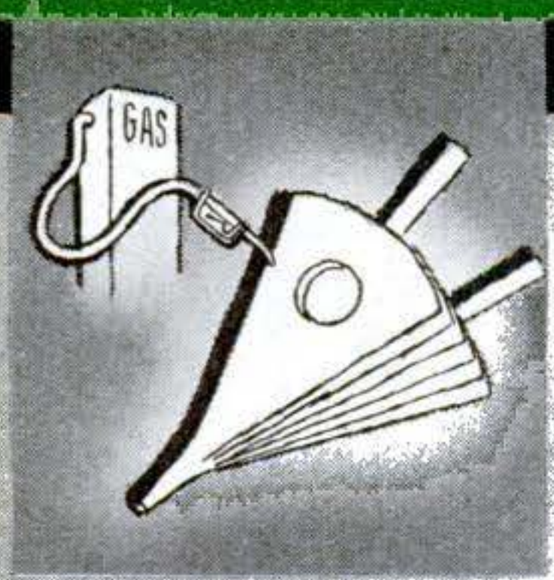


**1.** Choke valve is closed, blocking air passage to carburetor, when engine is cold. This creates suction on fuel jets when engine is cranked. Enough air sneaks past unbalanced valve to provide starting mixture.

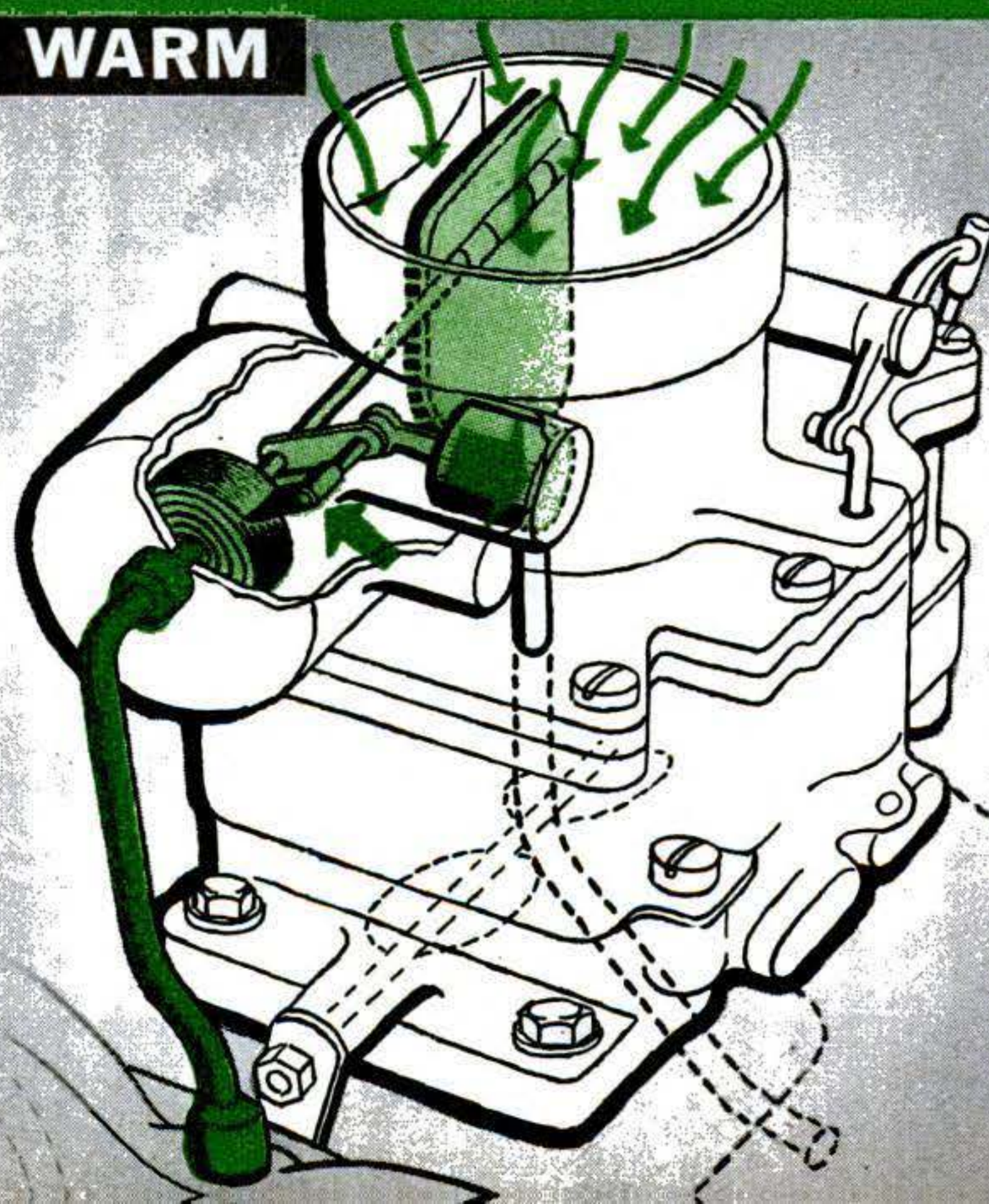
**2.** Thermostat spring, attached to same shaft as choke piston and choke valve, remains tightly coiled while engine is cold. It resists suction on choke piston, which tries to open choke valve as car starts.

**3.** As soon as engine is running, intake manifold suction, exerted through vacuum channel to base of choke cylinder, begins to pull on choke piston.

## WARM



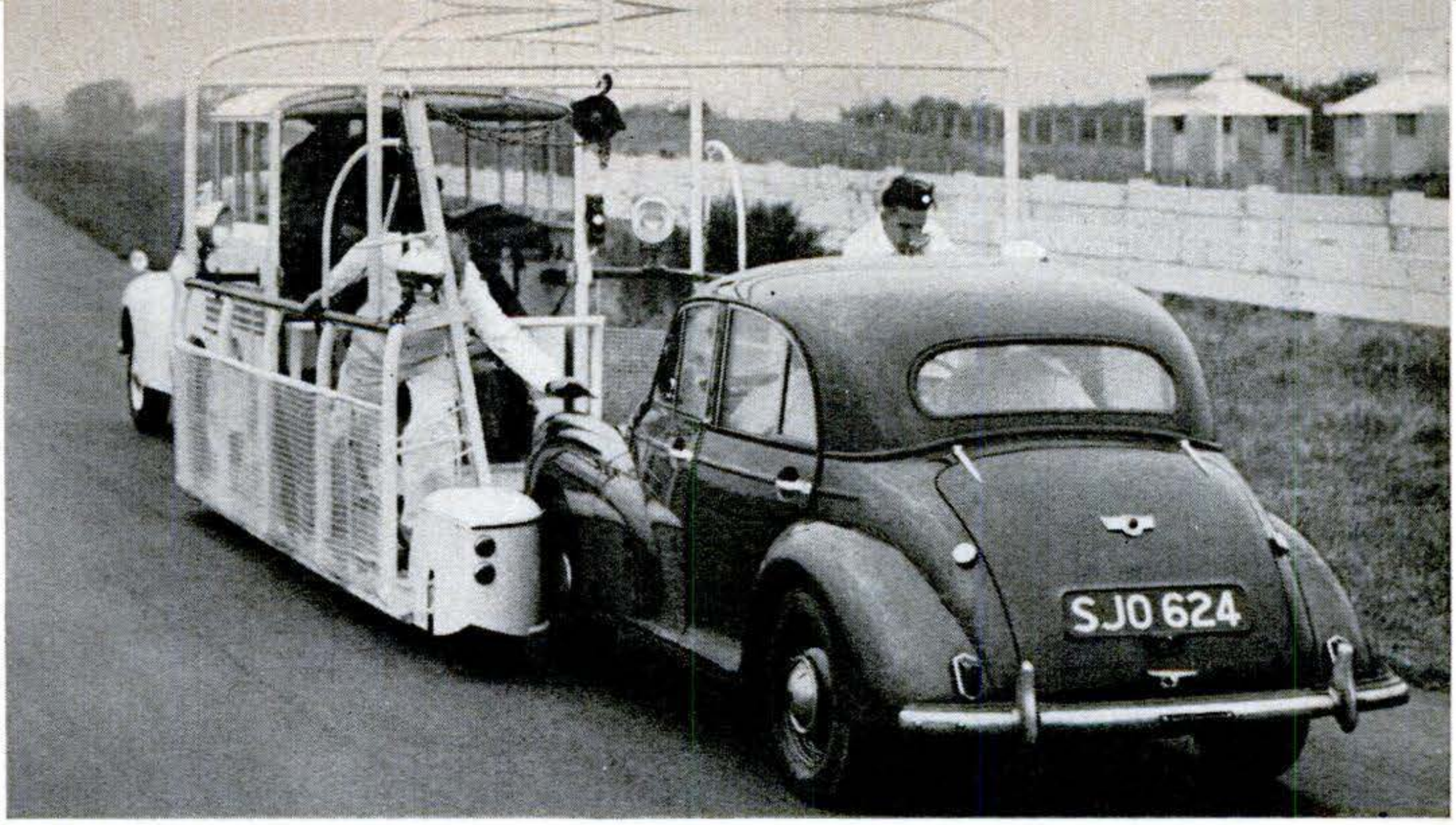

A warm engine demands lots of air and less fuel.



**3.** Choke valve is now opened wide by movement of choke piston.

**1.** As engine speed increases, hot air, heated by exhaust manifold, is drawn up tubing and through coils of thermostat spring by suction exerted on loosely mounted piston at other end of choke housing. This causes spring to expand, releasing choke piston.

**2.** Intake manifold suction, increasing with engine speed, pulls choke piston to end of cylinder. This turns shaft of choke valve.



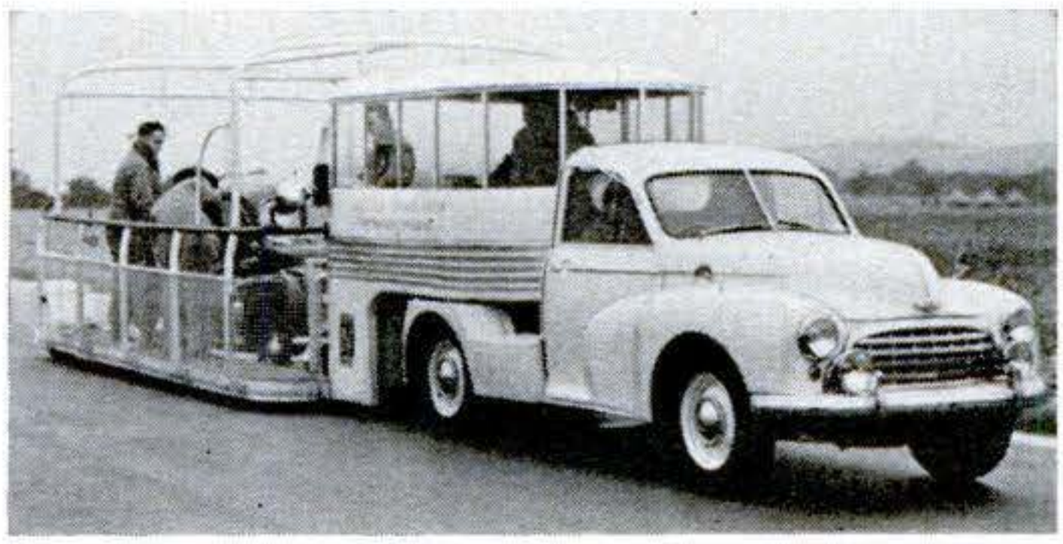

**TIME FOR A CHANGE** of oil, tire or crew finds the little Series II Morris Minor nosing into the rear recess of the special maintenance tender that serviced it while it kept on going.

# British Car Goes 10,000 Miles Without a Stop

IT DIDN'T start out as a stunt, but as a routine bit of engineering research. The Nuffield Motor Co. of England wanted to find out what would happen to the tire and gas consumption of a Morris Minor if it were driven for 10,000 miles without stopping around a circular track, as opposed to being driven the same distance over straight roads.

But to keep the car in motion, the engineers had to build a maintenance tender with a sort of bay in the back, flanked by catwalks for mechanics. Into this bay the Morris Minor slid periodically for refueling, changes of oil and even changes of tires.

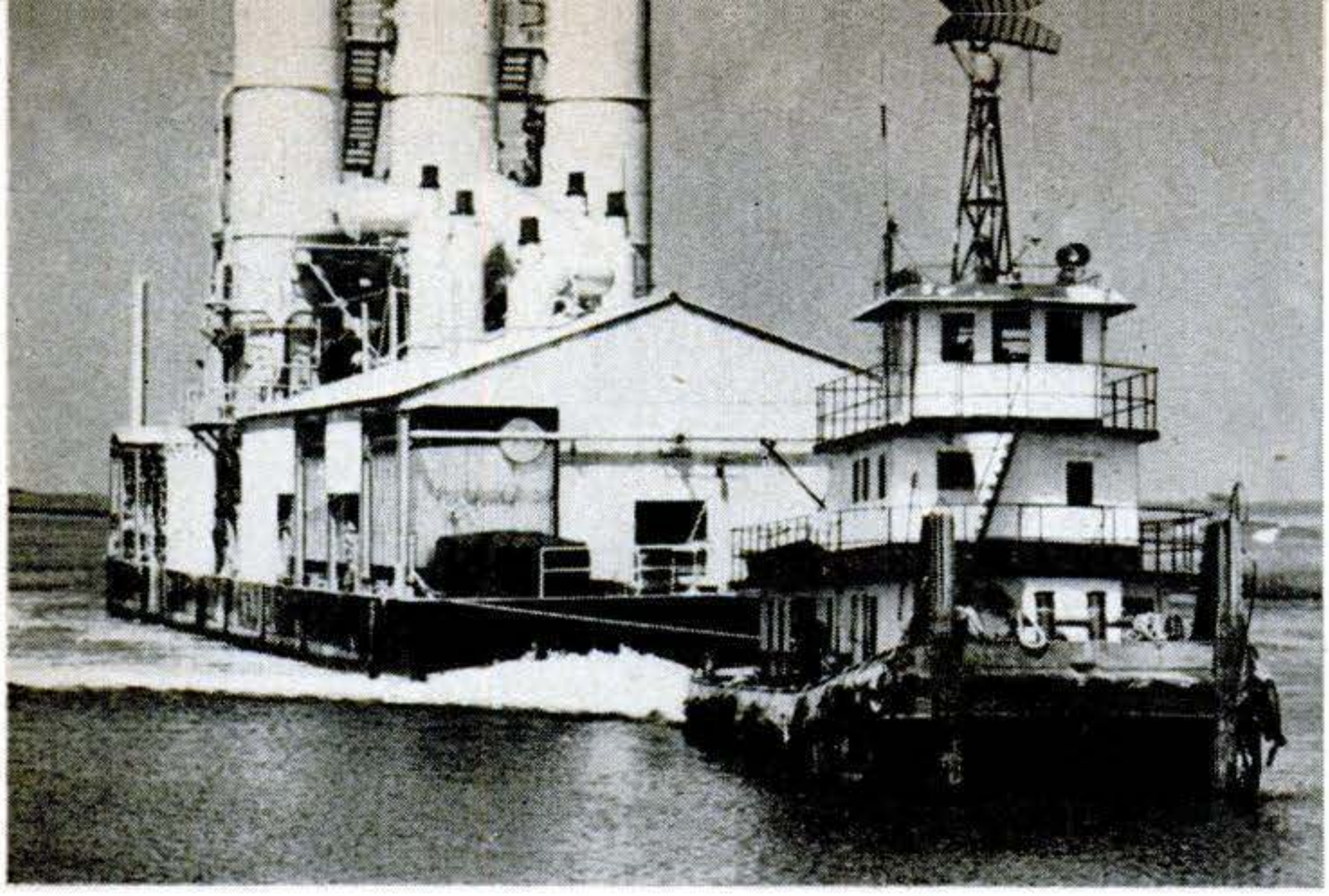
Tests showed that the car used enough extra power in 10,000 curving miles to go up Mt. Everest 12 times, and six times as much tire rubber as in 10,000 straight miles.



**CHANGING A REAR TIRE** (above), a neat trick to do without stopping, was accomplished by hoisting the wheel affected and braking it while the other rear wheel kept on driving. At left: a grease job is done "on the wing."



Copyrighted material



## Sulfur Plant Floated to Mine

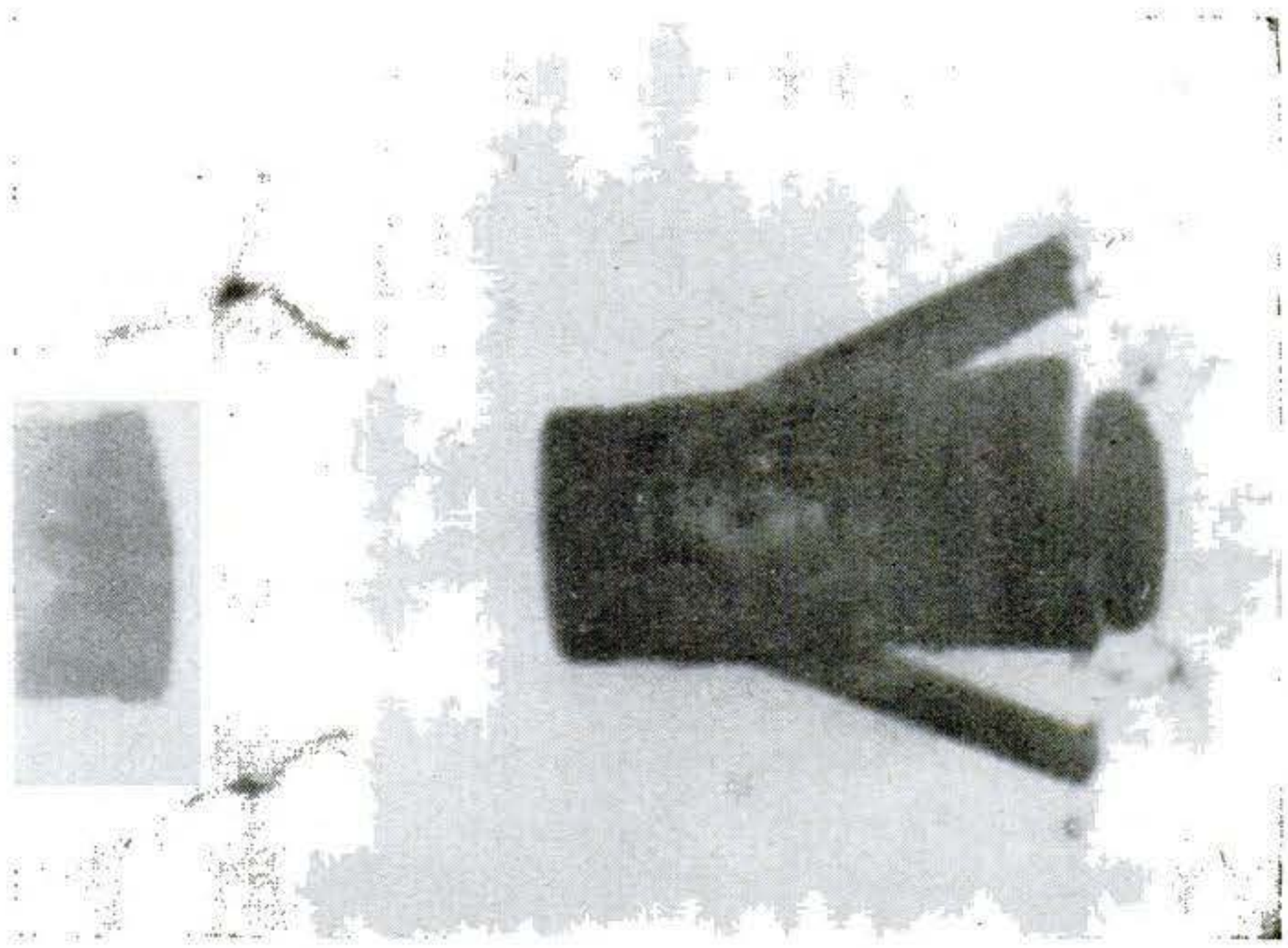
DEEP below Louisiana marshland lie valuable sulfur deposits, mined by pumping superheated water into them. The water melts the sulfur, which rises to the surface up the bore holes. It's too costly to erect a permanent mining plant there, so Freeport Sulphur Co. floated one (left) 65 miles down Mississippi to the site.

## Grapeshot Brought Up-to-Date for Korean Use

BACK in the Mexican and Civil War days, a whiff of grapeshot was the old reliable way to repulse an enemy charge. It was like making a shotgun out of a cannon and using nuts, bolts and metal scrap for buckshot.

The idea, utilized in a crude form even as far back as Bunker Hill, has been modernized for use in Korea against mass attacks, when high-explosive shells would overshoot and machine-gun fire would endanger our own troops.

Can projectiles containing more than 1,000 steel pellets of uniform size (at left below) are today's grapeshot. When they explode (at right below), the pellets fly out in the shape of a fan.



## *They Say Now.....*

*"How many people, when electricity was discovered, could visualize a modern television set? . . . Atomic energy gives every indication of bearing the same rich fruit."—Gordon Dean, chairman, Atomic Energy Commission.*

*"The men who will be tomorrow's managers are the men who can see beyond today's job."—Sidney A. Swensrud, president, Gulf Oil Corp.*

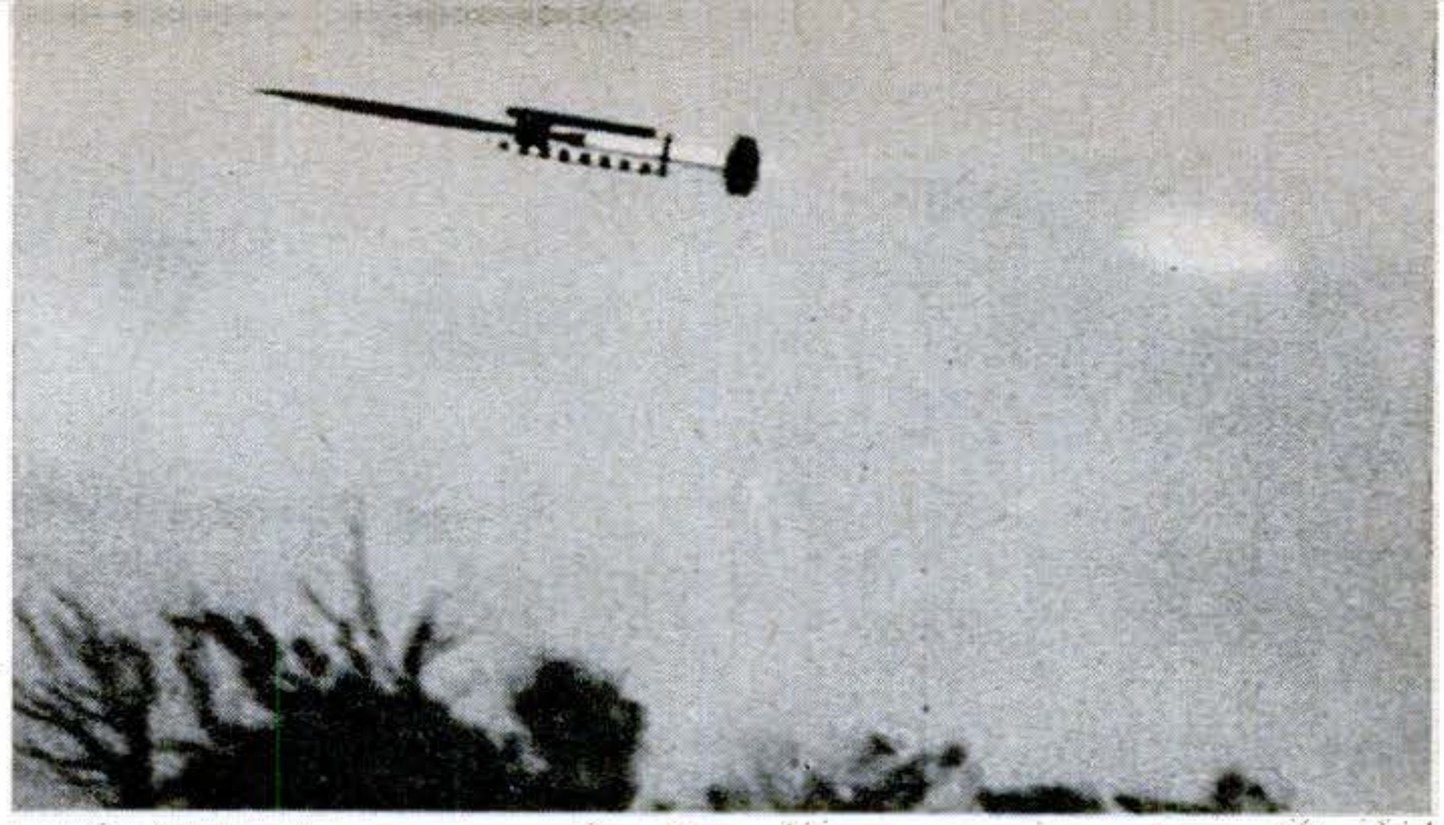


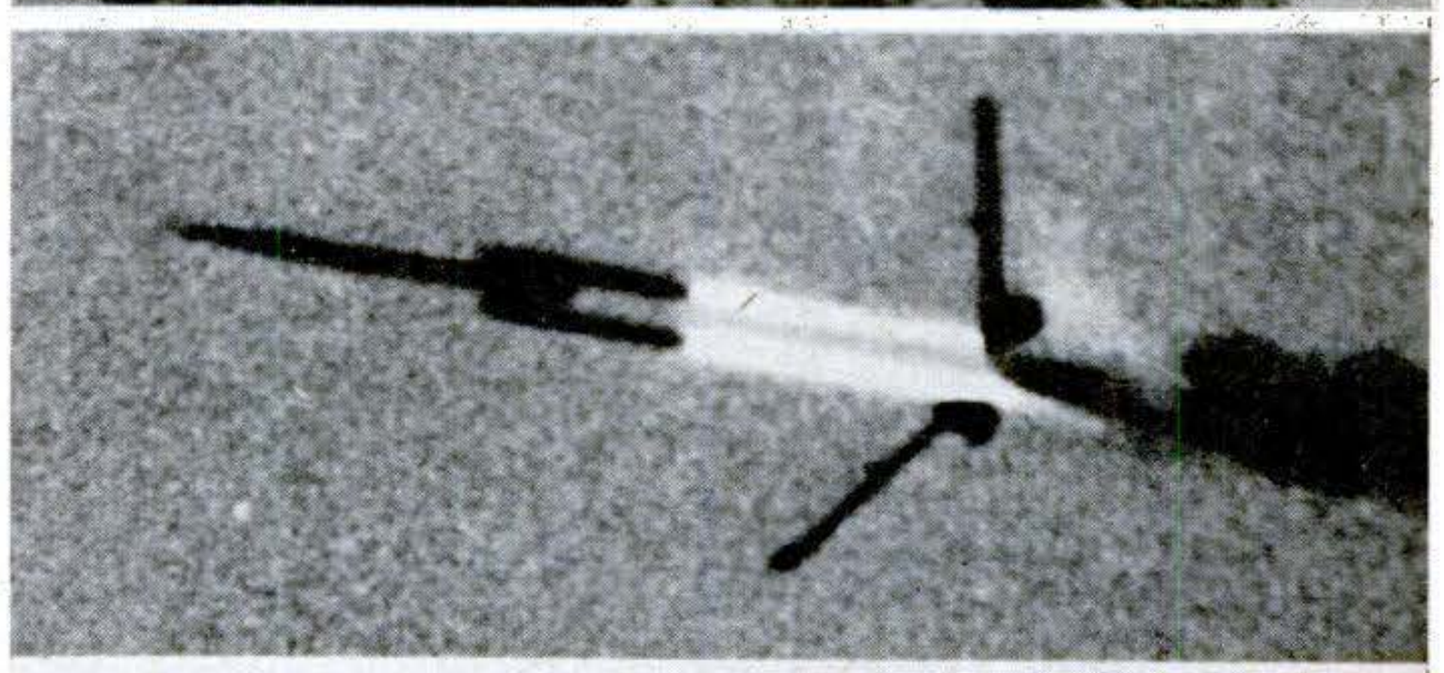
Copyrighted material

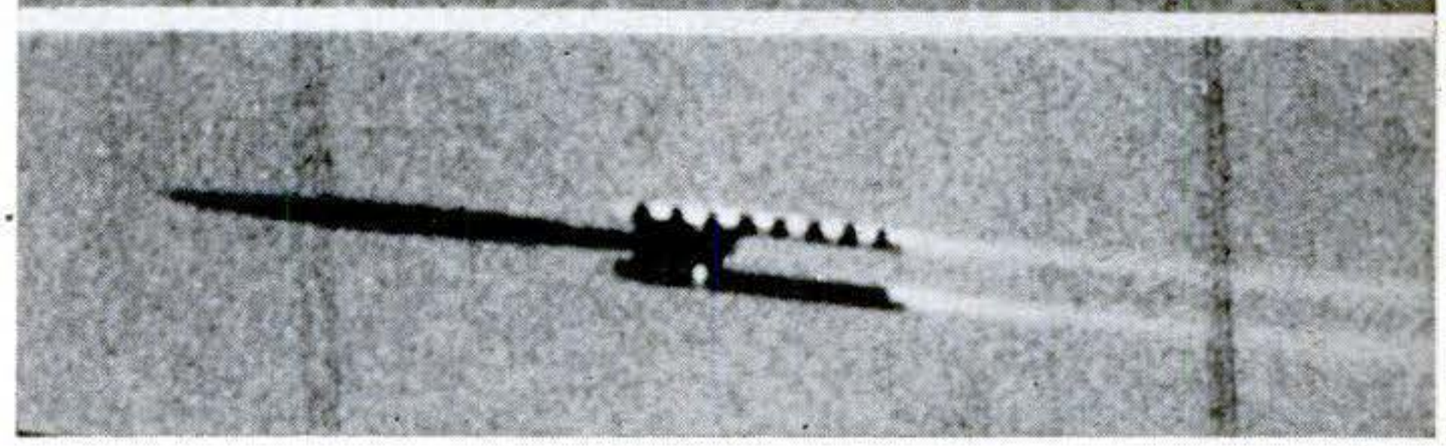
## Ramjet Now Used As AA Missile

A NEW wrinkle in antiaircraft weapons is being tried out by the British. It's a ramjet assisted at take-off by rockets. When the jet-driven, wingless missile reaches supersonic speed, two rocket boosters, attached at its back, slide away and the missile proceeds under its own power.

In the top picture of the sequence at the right, the missile is shown with rockets attached, just after being launched from a twin-railed ramp. The second photo shows the 7.5-inch rockets dropping away. In the final photo the missile, which is being developed by the Bristol Aeroplane Co., is in free flight, propelled by twin nozzles from its single ramjet engine.

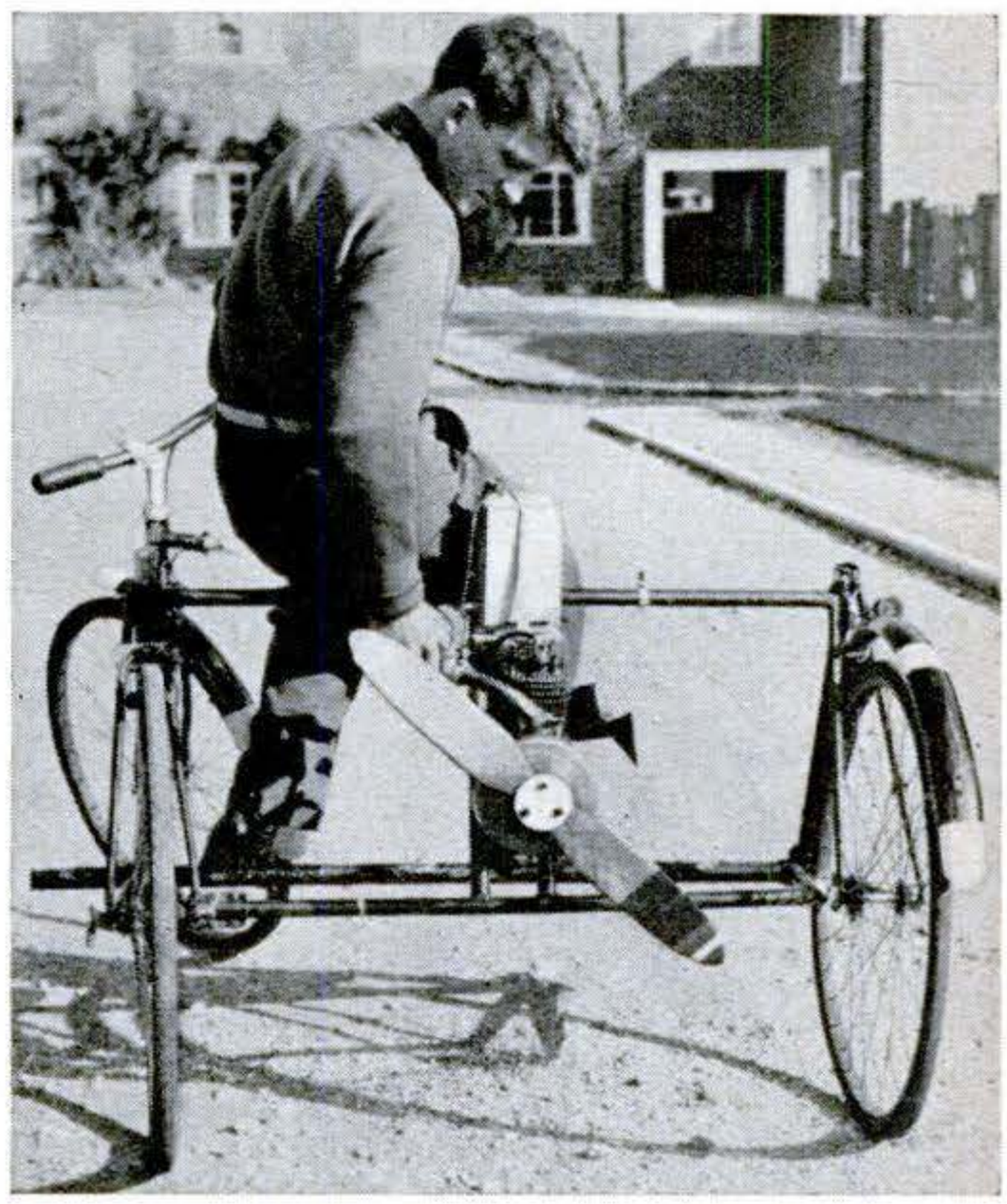






## Kids' Hoop Rolls Down Ramp

THE toy hoop above always gets off to a straight start, for it rolls down a ramp on the handle of the metal guide rod. Called Roll-A-Hoop, it is made by Heaton-Hanset, 3607 N.E. 15th Ave., Portland, Ore.



## Propeller Puts Zip in Bike

PUSHED by a tiny airplane propeller driven by a 98-cc., two-stroke engine, the tricycle above carries its builder, Malcolm Reece, along the streets of Southampton, England, at a brisk 30 miles an hour.



Copyrighted material

Nate Haseltine, *Washington Post*

Waldemar Kaempffert, *New York Times*

# Experts Pick 1952's

Victor E. Cohn, *Minneapolis Tribune*

***Medicine leads atomic research two to one as 10 crack science reporters choose the hottest stories of the year. Here are selections of men who cover the labs.***

**By Hartley E. Howe**

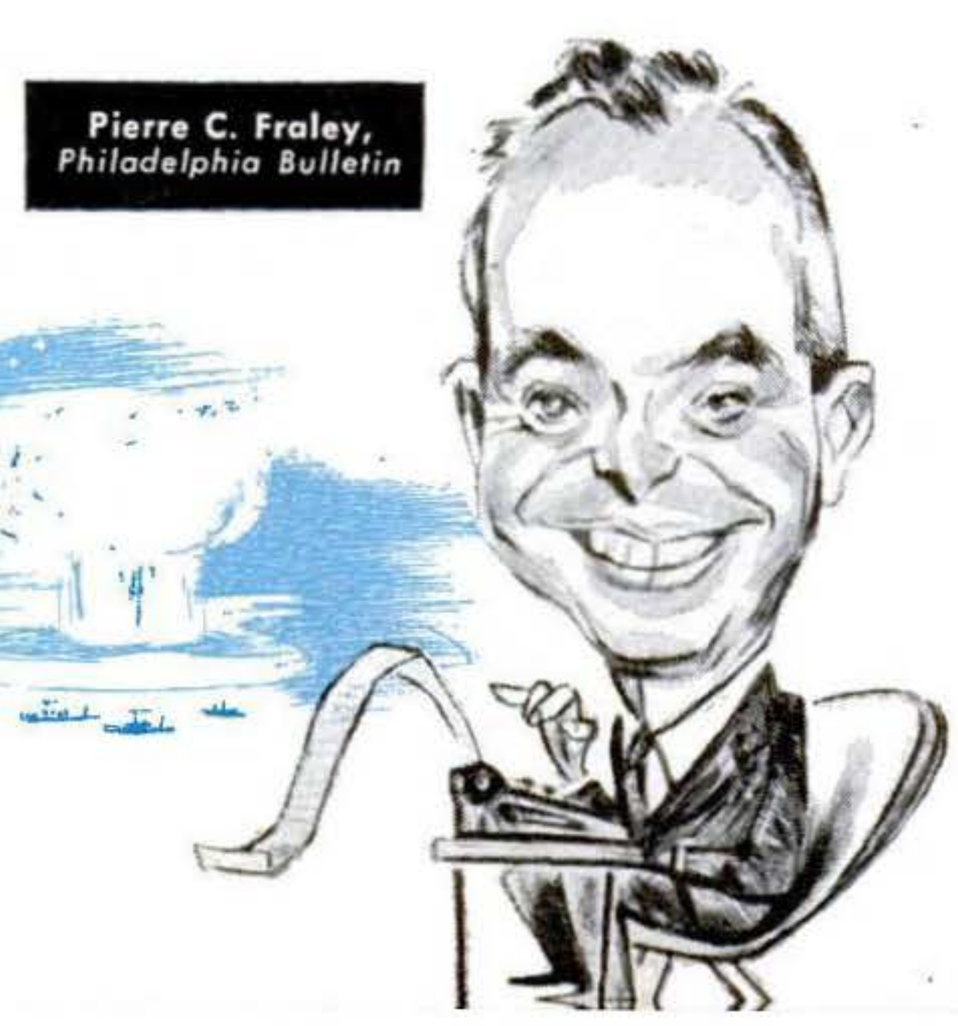
**CARICATURES BY SAM BERMAN**

ARE new victories in the war against disease the biggest science news of the year? Or will 1952 be best remembered for long strides taken in man's exploration of the atom, with its hope for richer life—and its threat of grimmer death?

Whichever you say, you can find experts to agree with you. For medicine and atomic research have dominated the science news this year—although a majority of the top science reporters picked medical news. Headliners include:

- The hydrogen bomb.
- New drugs to help prevent and relieve polio.

Watson Davis, *Science Service*



Pierre C. Fraley, *Philadelphia Bulletin*



Copyrighted material

Arthur J. Snider, *Chicago Daily News*

Severino P. Severino, *Cleveland News*

# Biggest Science News

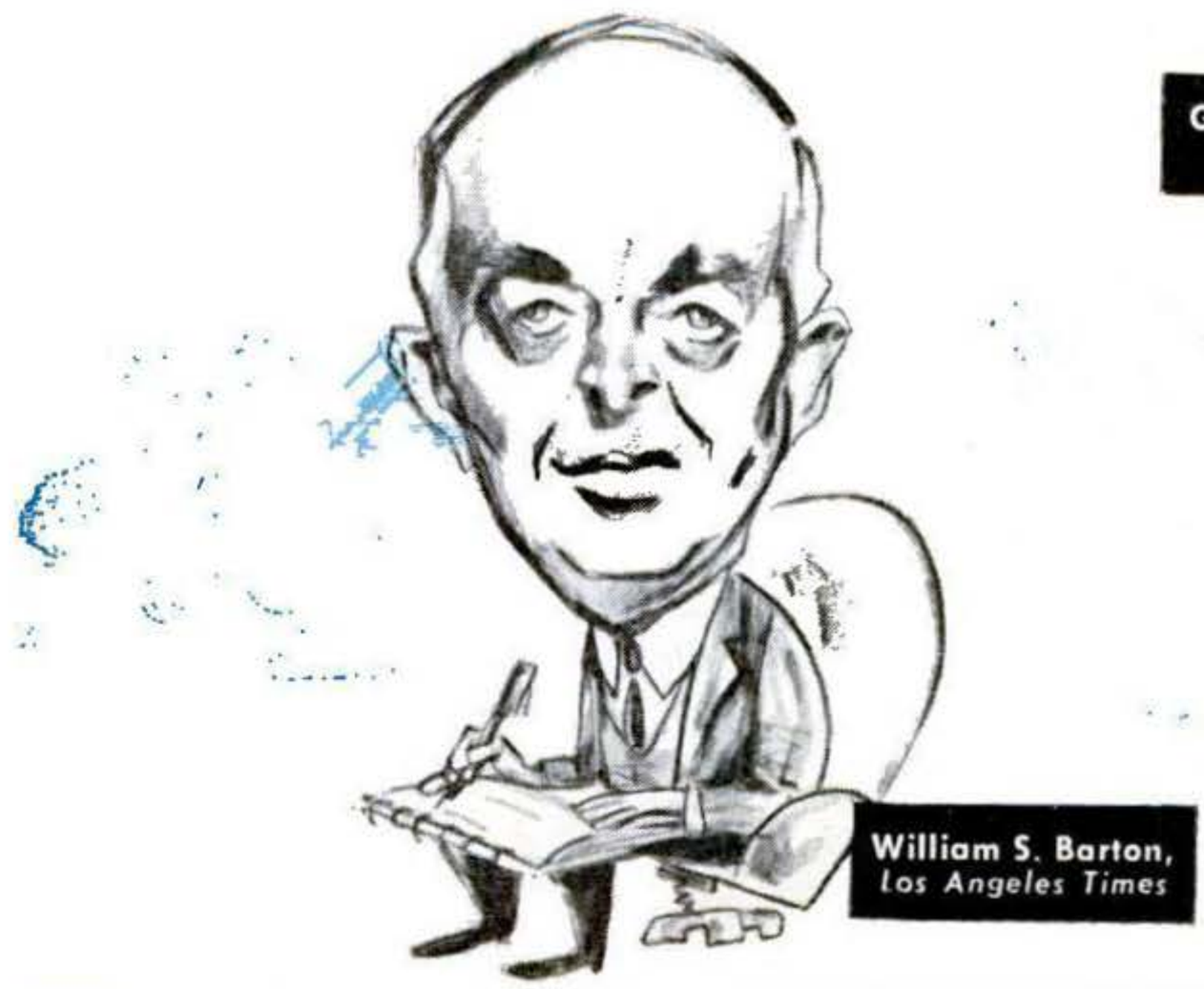
- The discovery of new anti-tuberculosis drugs—and their limitations.
- Electricity from atomic energy.

POPULAR SCIENCE MONTHLY asked 10 of the nation's outstanding science editors and reporters—all members of the National Association of Science Writers—to choose the biggest science stories of 1952. Six of the 10 picked events in medical research. Three chose atomic developments. Only one went outside these fields for his selection.

The lone eagle is **Victor Cohn,** science reporter for the *Minneapolis Tribune.* He believes the big story of the year was the exposure of a possible weak spot in our national defense. Cohn points out that Dr. Vannevar Bush, wartime science-research head, has challenged the ability of the armed forces to make use of new scientific developments, claiming that the joint chiefs of staff and their advisers are badly organized. Equally sharp criticism, Cohn notes, comes from Lloyd V. Berkner, who is a Defense Department consultant and heads the group

Alton L. Blakeslee, *Associated Press*

Gobind Behari Lal, *American Weekly*



William S. Barton, *Los Angeles Times*

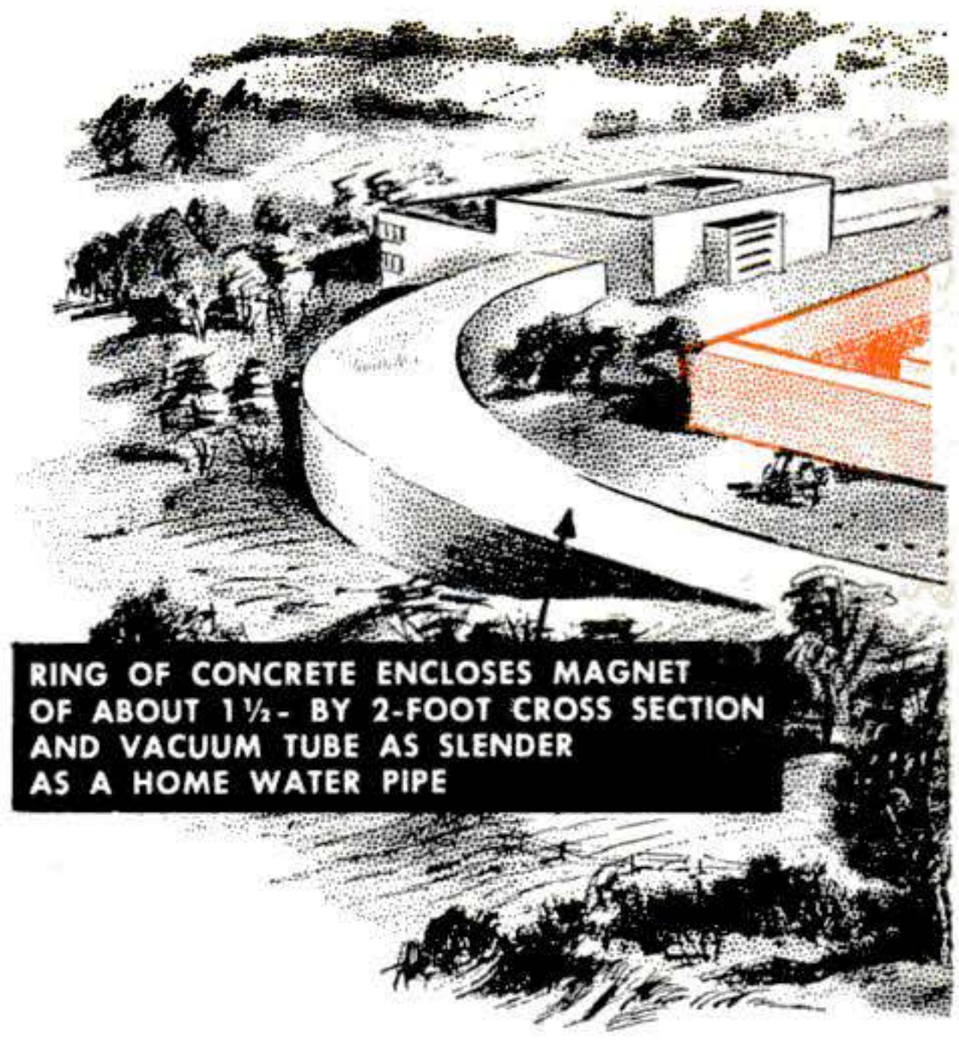


Copyrighted material

# Will U. S. Build This Atom Gun?

**The world's most powerful atom smasher, Brookhaven National Laboratory's 3,000,000,000-volt Cosmotron, began work this year. But now a way has been found to build atomic guns of 30,000,000,000 to 100,000,000,000 volts' power. Development of plans for such a giant is likely to be one of the big science stories of 1953.**

**Brookhaven physicists have discovered how to focus atomic particles into a narrow beam and thus accelerate them within a far slimmer vacuum tube. This will reduce thickness and cost of a ring-shaped magnet to guide them in a circle, and may lead to the atom smasher pictured—2,000 feet across and of 100,000,000,000-volt power.**


RING OF CONCRETE ENCLOSES MAGNET OF ABOUT 1½- BY 2-FOOT CROSS SECTION AND VACUUM TUBE AS SLENDER AS A HOME WATER PIPE

that runs the Brookhaven atom center.

Berkner believes that Russia will have a dangerously big A-bomb pile within five or 10 years, and says:

"Early in 1951, scientists close to military problems began to realize that a series of technological 'break throughs' had occurred that might make a sound defense reasonable and effective." This job is urgent and direct communication between top scientists and top U. S. planners is now so poor that a new civilian-scientist weapons agency needs to be organized, Berkner argues.

And Cohn sums it up: "Seldom has an American scientist made a policy statement so challenging."

**Waldemar Kaempffert,** science editor of *The New York Times,* picked the new antituberculosis drugs as the biggest '52 story. Called hydrazides, the drugs were first used with remarkable results at New York City's Sea View Hospital.

### *New Anti-TB Drugs Better, Cheaper*

Kaempffert says, "After nine months of clinical experience, it turns out that the hydrazides are no perfect solution of the problem presented by tuberculosis. The TB bacillus quickly adapts itself to most antibiotics and chemical therapeutic agents, the hydrazides included.

"Yet even cautious medical men admit that with the hydrazides it is possible to treat tuberculosis with an efficacy not hitherto achieved by other drugs. And a hundred dollars' worth of hydrazide will do as much, and sometimes even more, than three thousand dollars' worth of other drugs."

The same story, but with the emphasis on the speed with which the drugs' limitations were found, was the choice of **Nate Haseltine,** science editor of *The Washington Post.* He points out that "intensive research with the hydrazides, in the face of public clamor for them, proved in the incredible lapse of but three months that the drugs are truly a boon to humanity but not the quick home cure that many had believed . . ."

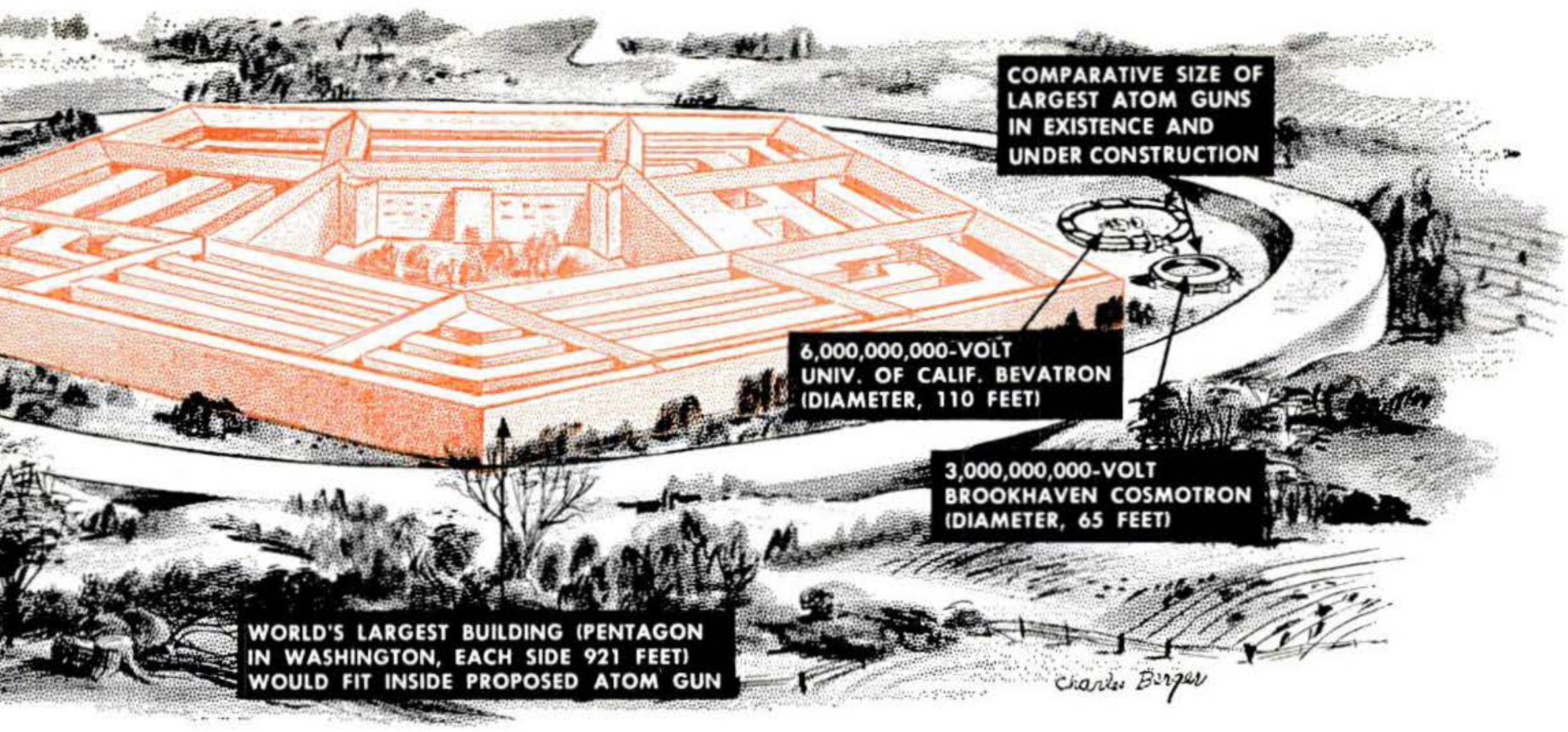
### *Polio Fought Two Ways*

Three experts chose research in infantile paralysis. **William S. Barton,** science editor of the *Los Angeles Times,* voted for a chemical treatment that rebuilds polio-withered muscles. He reports surprisingly promising results in a limited series of tests when two inexpensive drugs, betaine and glycocyamine, are given patients left crippled by the disease. Where the muscles retain some residual activity, their power increases. In some cases the muscles actually grow 40 percent. A boy with a withered arm can do push ups.

Dr. M. E. Borsook of Los Angeles, aided by two other doctors, developed the new drugs. The doctors believe that the drugs increase the supply of creatine, a tonic normally found in muscles. This enables what muscle is left to take on a



Copyrighted material




good part of the load of those destroyed by polio.

**Gobind Behari Lal,** science editor of *The American Weekly* and the Hearst papers, also picked a polio story. But Lal's deals with prevention—a vaccine made from the living disease virus. This year saw patients who had been given the vaccine complete two years without harmful results. Lal writes:

"Dr. Hilary Koprowski and his colleagues of the Lederle Laboratories had developed a TN virus, a weakened polio virus, which they boldly fed to children. In their blood were formed antibodies, chemicals capable of fighting the disease-causing virus of a given type. At the same time, Dr. Harold R. Cox of Lederle found how to grow the weakened virus in chicken eggs. Although used so far only on monkeys, the egg-grown virus could mean a mass-produced vaccine.

"Here is the possible lead to a practical method of 'vaccinating' against polio—and may loom up as the most important science story of 1952."

**Arthur J. Snider** of the *Chicago Daily News* picked yet another polio story. "Disclosure that injections of gamma globulin containing antibodies against three known polio viruses gave 'significant protection' against paralytic polio gives us for the first time a material shown to be effective in blocking to a large degree the paralysis of polio.

"While this is not the final answer to polio—the duration of immunity is too short—gamma globulin may dampen the severity of the disease."

**Alton L. Blakeslee** of the Associated Press chooses the development of a mechanical heart that works in humans as 1952's big story. Three Detroit doctors—F. D. Dodrill, Edward Hill and R. A. Gerisch—revealed that the power-driven "heart" had been used to help pump blood through a patient for 50 minutes while his heart was opened to fix a valve.

The mechanical heart works like a six-cylinder auto engine—General Motors engineers helped develop it. Blakeslee points out that it means the first step toward a time when it will be possible to bypass a person's heart while surgeons make repairs.

### *Atomic Power Created*

Now let's give the atom boys their innings. **Severino P. Severino,** science editor of the *Cleveland News,* picked the new 3,000,000,000-electron-volt Cosmotron at Brookhaven (PSM, April '52, p. 110) as the big science news of the year.

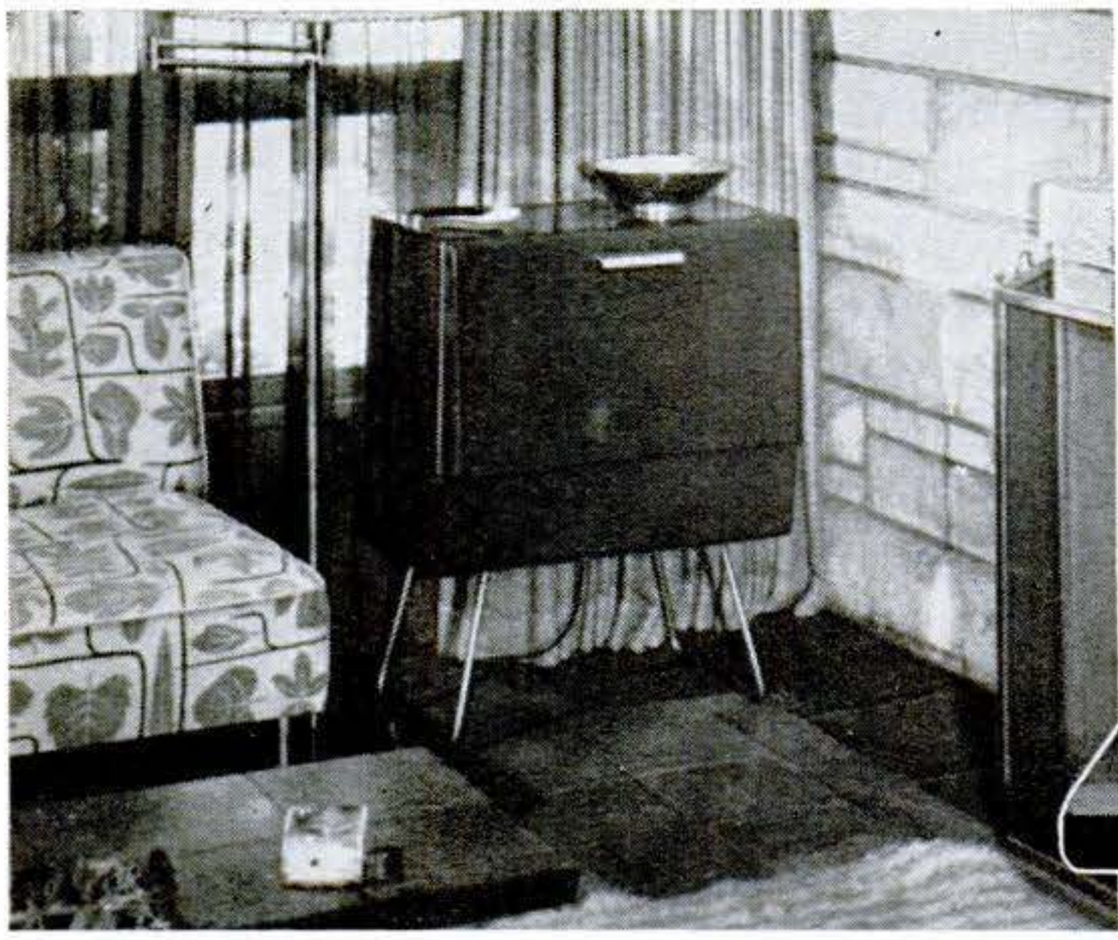
"This promises to open new fields in this age of atom smashing," Severino declares. "A new 'big muscle' that can produce the highest energy ever achieved, it brings us closer to learning the secrets of the atom than ever before."

But a really smash-headline atom story is the H-bomb, chosen by **Pierre C.**

[*Continued on page 246*]

# New Furniture Does Two Jobs

**1. Hassock Becomes Tables.** This come-apart footrest makes three benches when you're short on chairs or three snack tables when food is passed. Lined up in a row, Stak-O-Seats makes a coffee table. The folding legs are hardwood, tops are plastic.



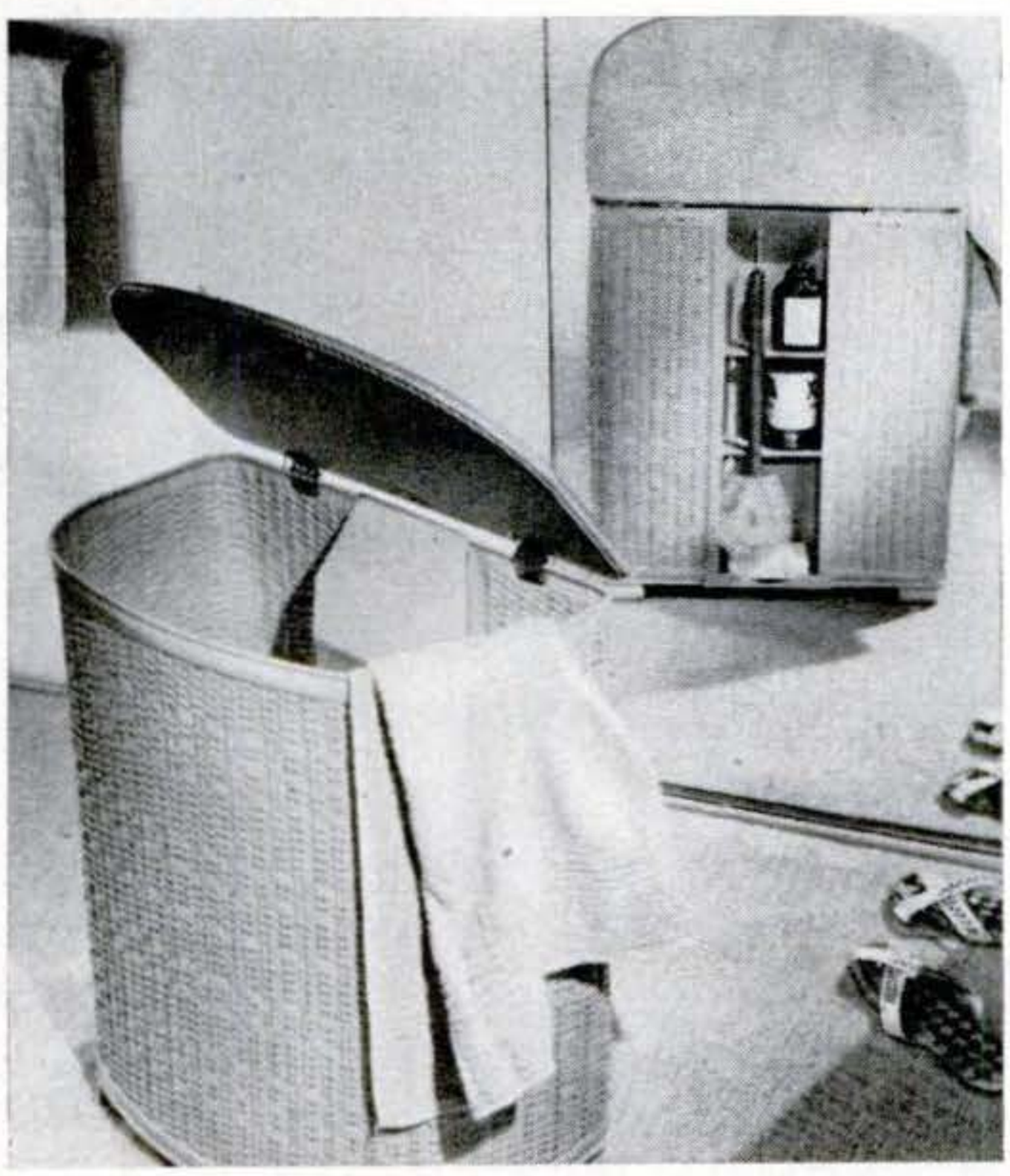
**2. Cabinet Masks Refrigerator.** A plastic cabinet (colored mahogany, blond or white) takes this refrigerator into any room in the house. It has two cubic feet of storage space and contains two ice trays. The open door forms a sturdy work counter. Shut the door and the Wonderbar's function as a snack server is completely disguised.

**3. Radio Beds Down with Lamp.** A radio is combined with a fluorescent lamp to let you read in bed while listening to your favorite musical program.

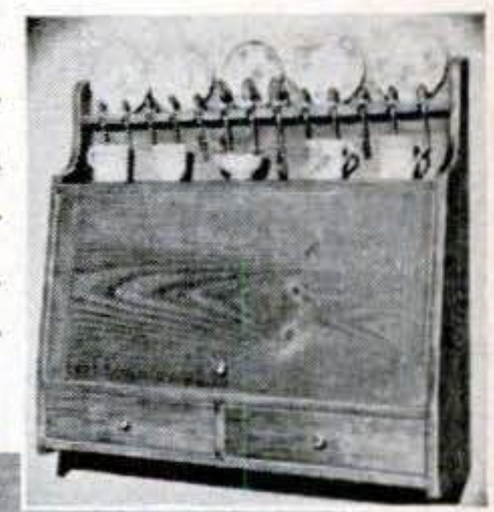
A frosted-glass lens over the lamp cuts out glare. The unit operates on AC or DC. Adjustable brackets fit the set to any headboard, and wall brackets are provided for mounting it over a Hollywood bed. The Lullaby combination is 12 inches wide.

Copyrighted material

**4. Table Folds into Wall Shelf.** Pull down the shadow box (left above) and the wall plaque on which it is mounted comes with it to form the table top 30 by 48 inches you see at right above. The Decor-Table is useful in a kitchen where traffic would be stopped by a regulation table since it folds out of the way when not in use.



**5. Rack Hangs Silver.** This slant-front hanging chest, lined with cloth that retards tarnish, holds 150 pieces. It comes in pine or mahogany finish.

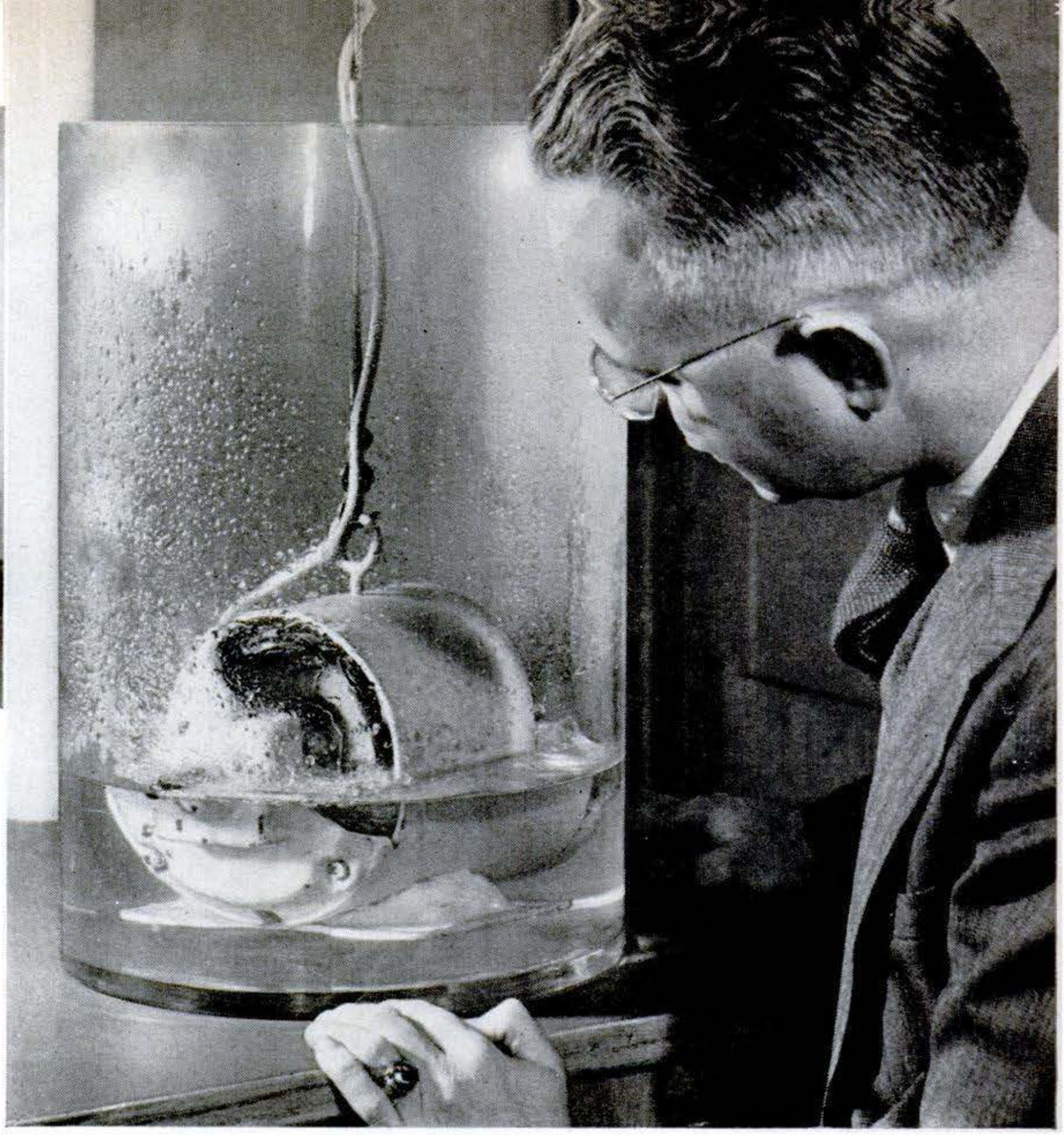


**6. Hamper Hides Storage Shelves.** Even the hamper does double duty. When this one turns its back, it hides a secret compartment for cleaning brushes, cleansers and bathroom supplies. Made of woven fiber and steel, it's called the Hold-A-Brush hamper.

*Further information on these products can be obtained from: 1. Greenhall, 509 Fifth Ave., NYC; 2. Servel, Inc., Evansville, Ind.; 3. Mitchell Mfg. Co., N. Clybourn & Terra Cotta Sts., Chicago; 4. Kebby Co., 2320 Custer Ave., Rockford, Ill.; 5. Yield House, Box 179, North Conway, N.H.; 6. Pearl-Wick Corp., Long Island City, N.Y.*



Copyrighted material



**BOUNCING PUTTY,** a silicone preparation, is nonresilient until formed into a sphere. Then it comes to life and rebounds like rubber ball (above). Its cousin, silicone rubber, insulates motor at right. Half under water, motor can run so hot that water boils.

# Look What's Happened

***Once an oddity, it now makes heatproof rubber, iceproof airplanes, waterproof clothing, leakproof cellars—and stickproof waffles.***

**By Richard Match**

ONE June afternoon in 1951, 37 F-84 Thunderjets rose from the Wright-Patterson Air Force Base at Dayton, Ohio, and streaked westward. Ten minutes after take-off, eight of the planes plummeted to earth in flaming wreckage. It was jet aviation's biggest disaster.

FBI and Air Force men combed the wreckage for evidence of sabotage. Four days later, they publicly identified the "saboteur"—ice had blocked the jet air intakes, and the strangled engines had exploded.

Air Force designers promptly sought help from the research chemists. Was there a rubber-like material that could be electrically heated to keep ice from sealing shut the air-intake doors? At temperatures hot enough to melt ice, natural rubber and even synthetics melt into a sticky mess or harden and crack. The chemists had an answer. It was a member of that extraordinary new branch of the glass family called silicones.

To laymen, silicones are most familiar in the form of "bouncing putty," an oddity developed during World War II.



Copyrighted material

This curious substance looks like bubble gum, molds like modeling clay and bounces higher than a tennis ball. Actually it is a chemical cousin of ordinary window glass—made, like all silicones, from coal, oil or gas and the silicon found in sand.

Appropriate molecular changes produce silicone rubber, a material which shrugs off temperatures 250° higher than could the most heat-resistant rubber previously known. American jet engines now have deicing flaps made of it.

***Rubber Resists Arctic Cold***

Silicone rubber proved as impervious to arctic chill as it is to tropic heat, retaining its stretch over a temperature range of 600°. Your new kitchen range, incidentally, may have the same kind of superhardy rubber strip around its oven door, to insure better-controlled baking temperatures.

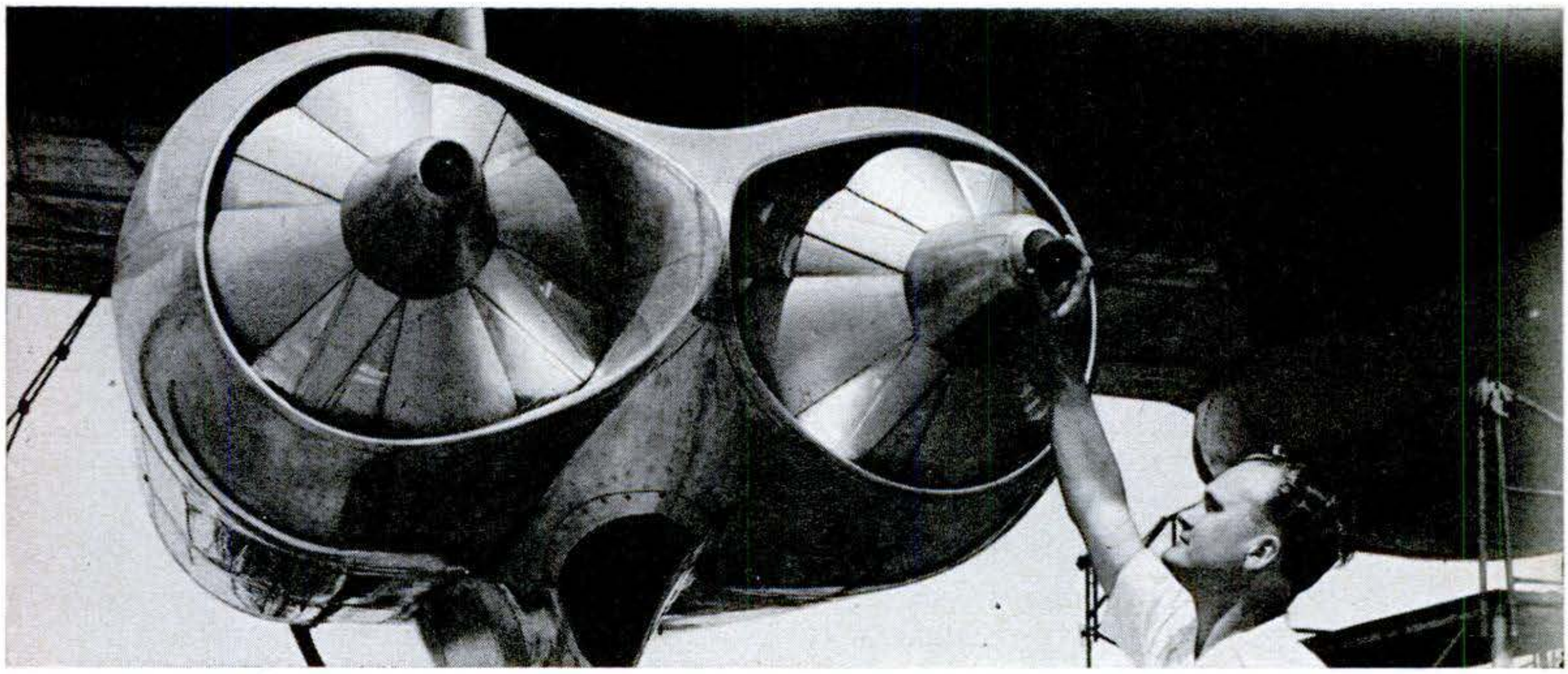
Rubber, however, is only one member of the resourceful silicone family. There are paints that do not blister on factory smokestacks furnace-heated 500° to 1,000°.

I have seen silicone water repellents that promise to solve forever the homeowner's ancient problem of leaky masonry. Ordinary cotton cloth, silicone-treated, sheds water as easily as a rubberized shower curtain. Silicone fluids, which pour at minus 120°, are used to fill the sextant bubble levels of aircraft operating across the North Pole. Silicone insulation, indifferent to the heat normally generated by electricity in action, enables electric motors to work twice as hard as they did before, at the same time prolonging their working life many times over.

The first organo-silicon compound was created in Germany in 1863. Later, an Englishman, Dr. Frederic S. Kipping, spent more than 40 years accumulating the technical knowledge on which modern silicone chemistry is built.

It was American chemists who put Dr. Kipping's pure science to work. In 1932 the Corning Glass Works—reportedly seeking a flexible window glass—hired Dr. J. F. Hyde to investigate the chemical realm between glass and plastics. By substituting a silicon-oxygen frame-

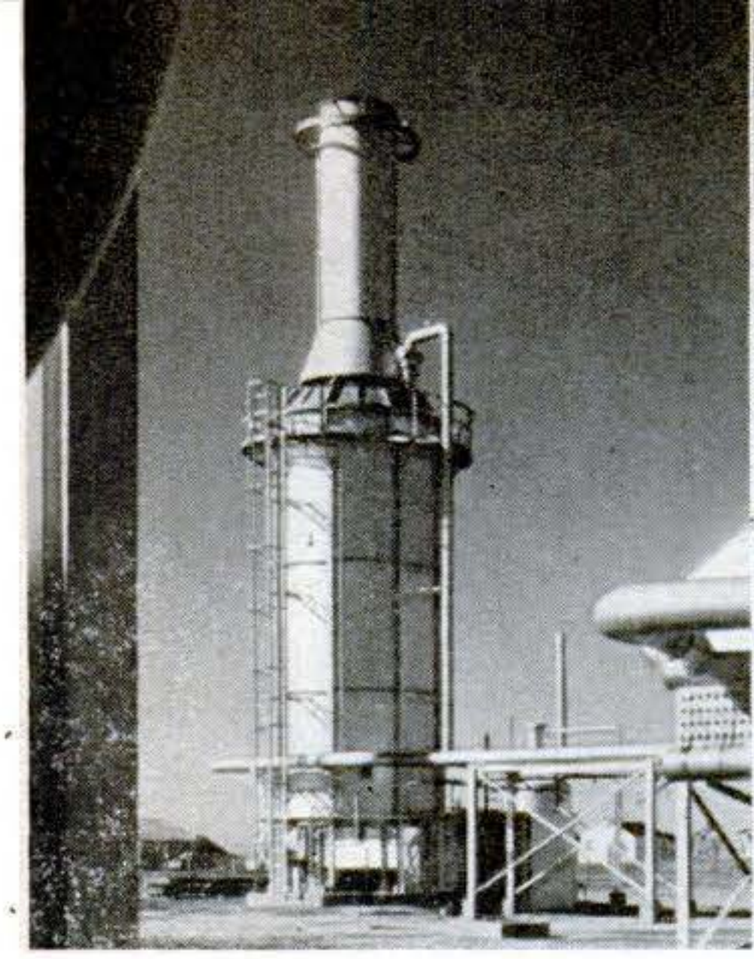
# to "Bouncing Putty"



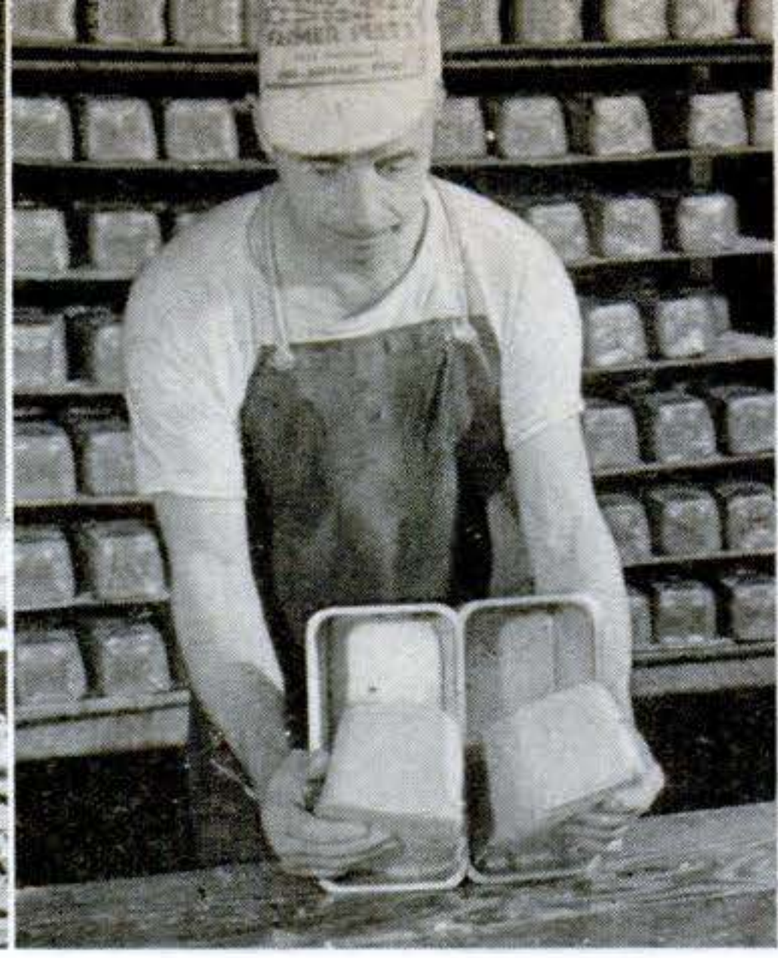
**DEICING PADS for air-intake doors of jet engines, made of heat-resisting Silastic (silicone rubber) reinforced with glass cloth, can be heated by resistance elements to 450°.**



Copyrighted material



**SILICONE PAINT** on this oil-heater stack will have life of 18 months or more, despite surface temperature of 400° to 600°. Other paints had lasted only a few days.



**BREAD WON'T STICK** to pans coated with Dow's Pan Glaze. A resinous silicone originally developed for dough baking, it is now used on meat-loaf pans and frozen-food trays.

**CAST-ALUMINUM PARTS** are released most easily from mold with aid of a silicone emulsion. Before casting, silicone is sprayed into hole through which molten metal flows.

work for the carbon-to-carbon structure common to such familiar materials as rubber, textile fibers and plastics, Dr. Hyde succeeded in making the world's first useful silicone. Shortly before, Owens-Corning had developed Fiberglas, which promised to be a superb insulating material if some equally heat-resistant resin could be found to hold the glass fibers together. Hyde discovered that a silicone resin would do the job, and a new industry was born. Dow-Corning is the silicone-producing offshoot of that discovery.

That same year, General Electric's chemical division independently launched its own silicone research. A few months after Pearl Harbor, GE's Maynard C. Agens made the first laboratory samples of silicone rubber. Union Carbide's Linde Division and Libby-Owens-Ford are the other major silicone producers.

### *Insulation Withstands 5,000° Fire*

Silicone-Fiberglas insulation is today one of the sinews of American industry. It possesses fabulous resistance to the two great foes of electrical insulation: heat and moisture. At the McGraw Electric Co.'s Pennsylvania Transformer plant, a 5,000° flame was applied for equal intervals to a sheet of silicone-Fiberglas and to a steel plate two inches thick. The steel was cut through, the silicone surface only singed.

In overload tests, motors with conventional insulation always shorted and caught fire when they failed. The silicone-protected motors never did. Silicone insulation, already widely employed in Diesel-electric traction motors, is gaining use in motors exposed to tough operating conditions in the textile and chemical industries and in protecting electronic equipment from moisture and heat.

### *Silicones Guard Ships*

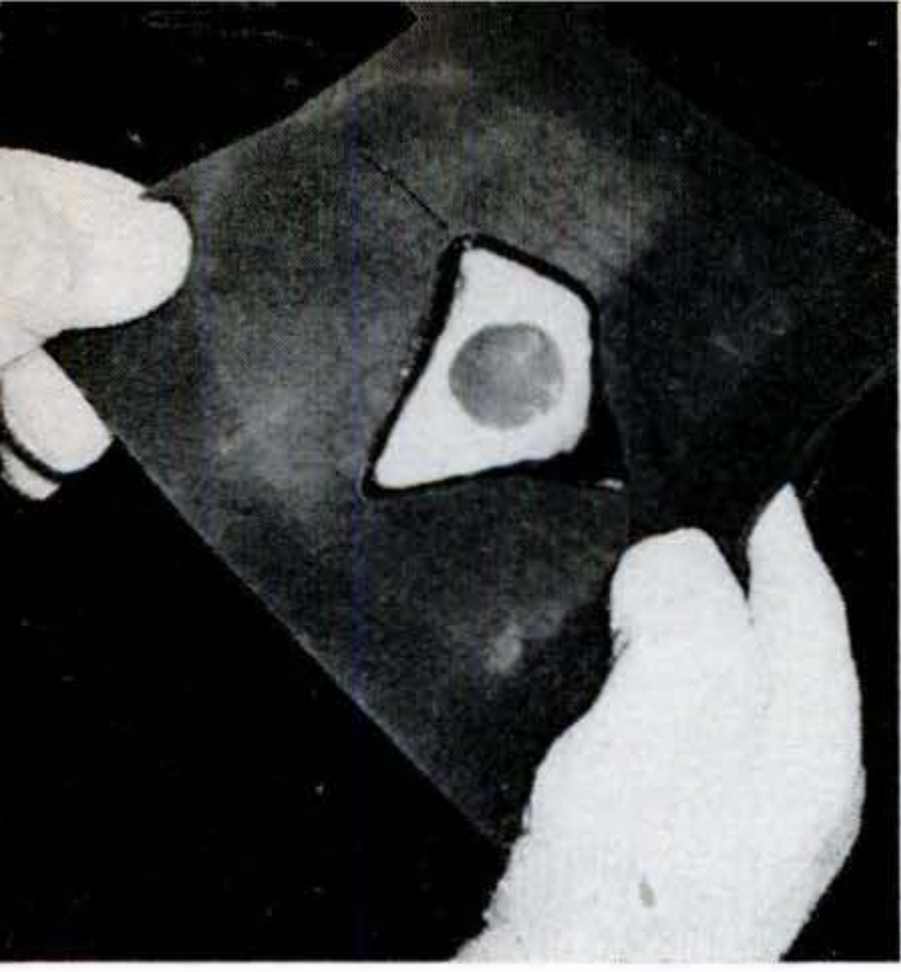
By Navy order, silicone insulation, both resin and rubber, now guards the most vital electrical cables on all new U. S. fighting ships. Silicone rubber is of particular importance to the Navy, for when it is exposed to flame, it simmers to a firm white ash. This ash is itself an adequate temporary insulator and keeps control cables working and big guns firing even after severe flame damage.

Eventually silicone tires may be a possibility. The drawback is that the silicone product has less tear strength and abrasion resistance than present tire rubber. The chemists, however, have been adding muscle to silicone rubber ever since World War II and admit that they have made notable progress.

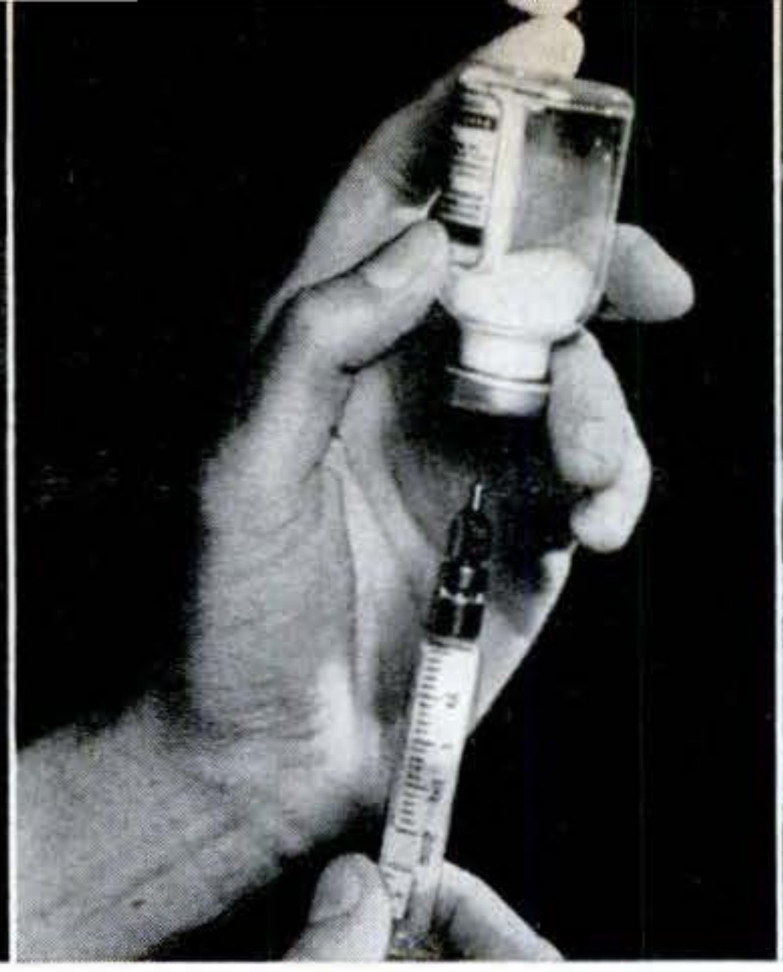
Another pleasant possibility for the car of the future is silicone lubrication. Silicone oils do not oxidize into gummy carbon sludge and consequently have



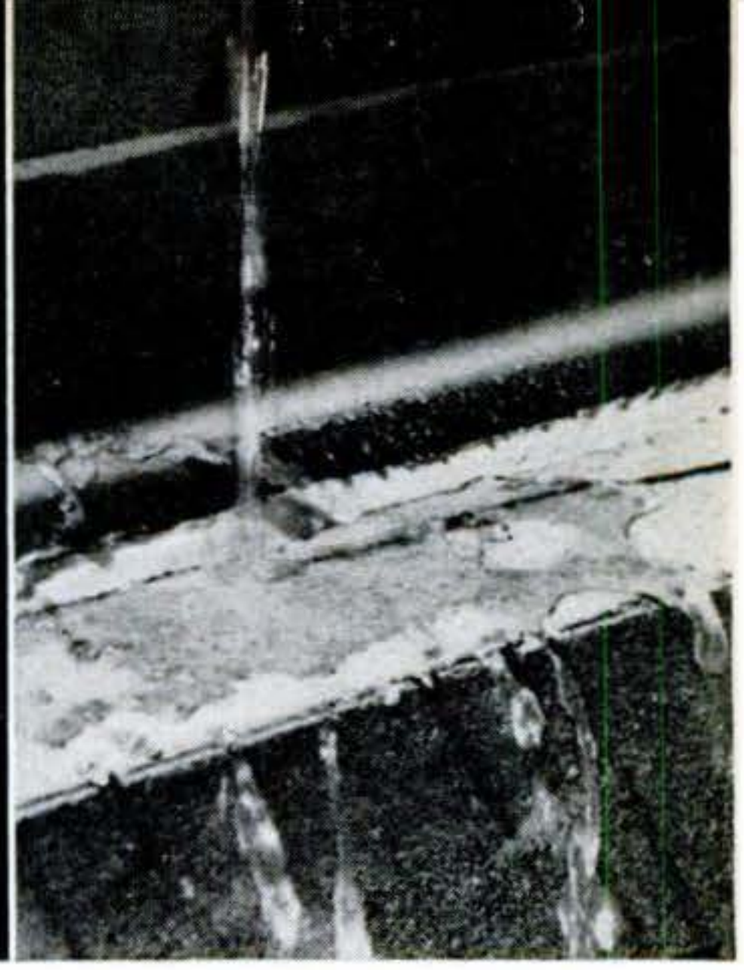
Copyrighted material



**EGG FRIES** on heat-resisting silicone rubber that has resistance elements embedded in it. Rubber is used in electric blankets and soil heaters as well as plane deicers.



**PENICILLIN VIALS** get an inner silicone coating that keeps a suspension of the expensive drug from clinging to its container, permitting the last drop of it to be used.



**LEAKY MASONRY,** an all-too-familiar problem of home-owners, is sealed by a new silicone water repellent. Window sill treated with it sheds water completely (above).

a working life anywhere from 10 to 40 times that of petroleum.

Silicones are not yet satisfactory crankcase lubricants, but they already have important industrial uses. Huge Detroit conveyor lines that used to keep a man busy full-time with an oilcan are now oiled once a week; machines that used to run six months between oilings now run three, four and five years.

In paint, the silicones' effectiveness lies in something they *don't* do—in their family trait of inertness, as chemists call it. Ordinary outdoor paints crack, peel and yellow chiefly because their resinous binders break down—oxidize—on exposure to the elements. Inert silicone resins stubbornly resist oxidation.

But the new paints are still too costly except for those jobs where the silicones' hidden strength makes them cheap

[Continued on page 248]

**CAR OWNERS** use silicones in quick wipe-on, wipe-off polishes (below), moisture-excluding "boots" of silicone rubber for spark plugs (upper left), and a compound that reduces corrosion when applied to battery terminals (lower left).

Copyrighted material

## Frenchman Cycles English Channel

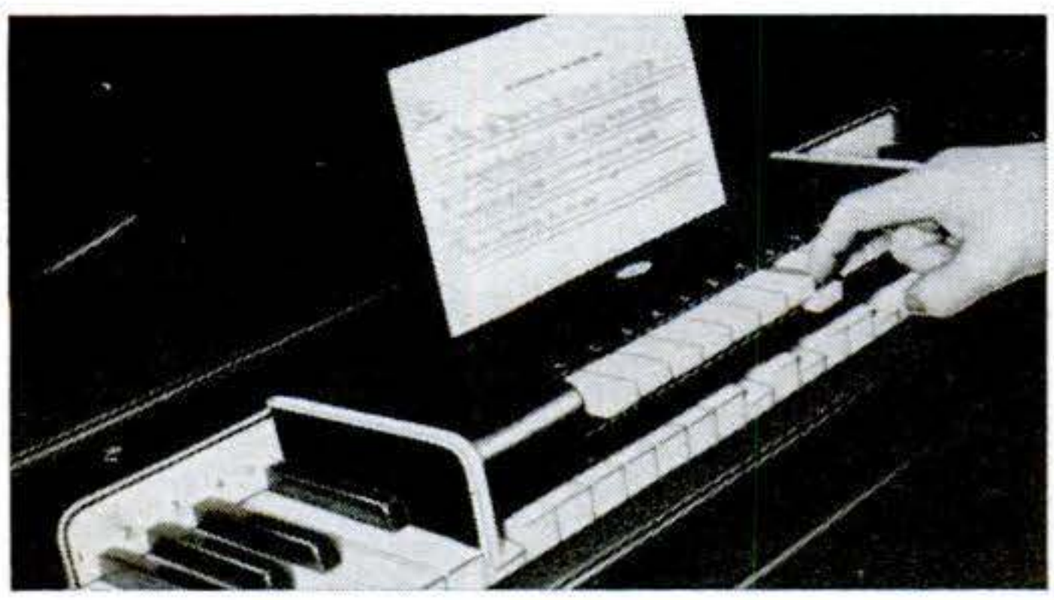
MOUNTING a motor scooter on an 18-foot raft, French motorcycle champion Georges Monneret put-putted his way across the English Channel. The scooter's rear wheel drove a propeller while the front wheel controlled a rudder. Once on land, Monneret shed the raft and drove happily off to London.

## Let It Snow! This Golfer Can Practice Putts in the Living Room

THE contented golfer at right is perfecting putts on a green eight feet by two. It stows away in a tube. Yund Bros., 39 New Scotland Ave., Albany, N.Y., make it.

## Pianist Can't Hit Sour Note

ONE-FINGER pianists now have an aid in an 11-note keyboard (below) that fits over a regular one and plays a pleasant three-note chord for each key struck. Playano Sales Corp., 10 E. 39th St. NYC 16, sells it.



## Special Chrysler with a New Sports-Car Look Is Shown in Paris

ALONG with its entire 1953 line of passenger cars for export, Chrysler showed the special sports coupe at left in this year's Paris Automobile Show. The car was built as a design study, not for sale. Made by Ghia in Turin, Italy, as were Chrysler's other experimental sportsters, the C-200 and K-310, it has high, curved fenders, wire wheels and a low, racy look.

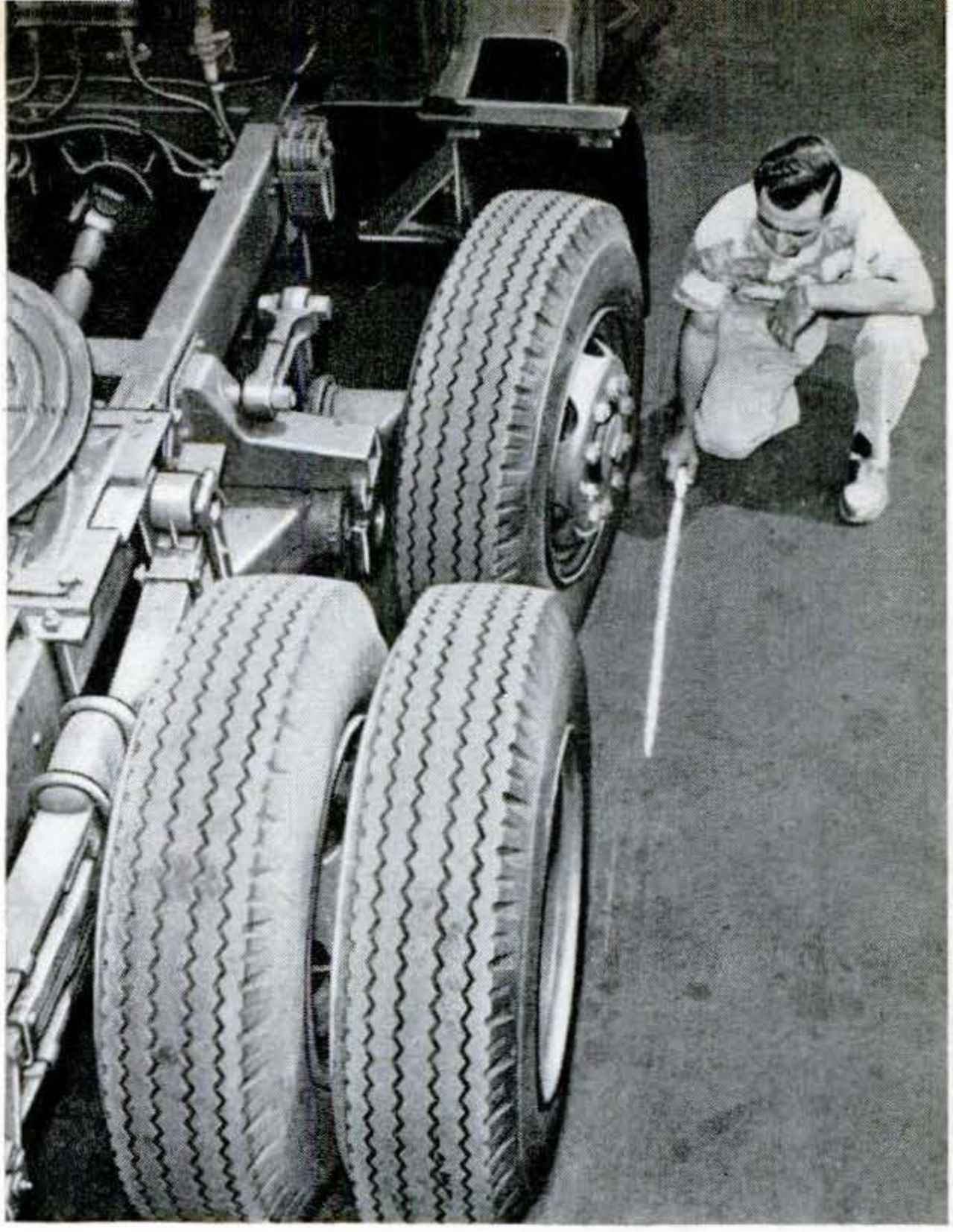


Copyrighted material

## Four Wheels Steer Truck to Bigger Payloads

• HIGHWAY trailers drawn by this new six-wheel tractor can turn corners more easily with bigger payloads. When the driver steers the front wheels, a drag link and tie rod swivel the middle wheels.

Steering knuckles are located at each of the single wheels on the independently mounted middle axle. To avoid drag, these wheels steer only a third as far as the front ones. The rear duals of the tractor are still the driving wheels. Adding a third axle allows operators to increase their legal payloads by 4,000 pounds. The White Motor Co. tractor can be used with all trailers.



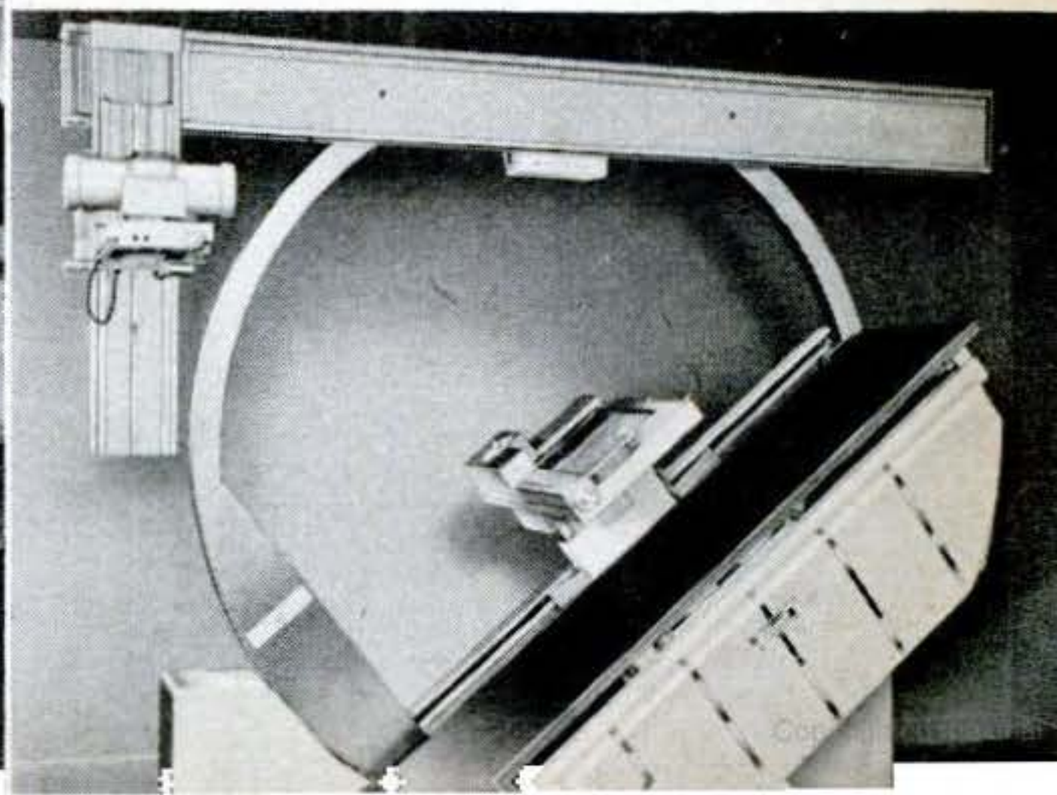
**CHALK LINE** dramatizes swiveling of the new White truck's second pair of steering wheels. Note that they turn only slightly although front ones are turned hard.

**STEERING PUSHER,** as middle axle is called, is seen at left on truck that road-tested it. Axle weighs 1,350 lb., has 10.00 by 20 tires.

## New X-Ray Table Rides Around Ring Track

SOMETIMES it is necessary to stand hospital patients on their heads to make X-ray studies of their innards. This is an awkward and cumbersome process with conventional X-ray tables. Now a new type, seen from two angles below, rotates the subject through 180 degrees on a ring track.

The ring mounting also permits lighter counterweighting for the fluoroscopic screen (left below) and saves space. General Electric makes it.



# P.S.

## Last minute news & notes...

"TIME-BOMB" PILLS now enable a patient to take enough doses of a drug all at once to last a whole day or night. Called a Spansule, each capsule holds as many as 100 tiny tablets with neutral coatings of graduated thickness, which take varying times to dissolve in body fluids and release the medicine . . . ANTI-POLIO PILLS to immunize children are on the way. They will contain a "tamed" form of living polio virus, Lederle experimenters predict . . . SYNTHETIC CORTISONE for arthritis and other diseases is now a reality. Merck chemists report that they can prepare it from simple, readily available chemicals.

JET-PROPELLED DIRIGIBLES are on trial in Italy. The first, 184 feet long and 42½ feet in diameter, is reported to have completed a series of successful test flights.

MAGNETIC "LABELS," read by an electronic brain, route cans of fruit through a California plant. The labels are signals magnetically recorded on the bottoms of the cans just as sound is recorded on magnetic tape. In this way, sealed cans containing different grades of fruit can share many of the same processing steps, then be separated after cooking.

AN INVISIBLE BEACON that you have to peep into to tell if it's lit has been developed for the Army by the Armour Research Foundation. The gas-burning lamp emits infrared rays that can be seen only with such special viewing aids as the Army's "sniperscope." It will be used for marking assembly points and road blocks without an enemy's knowledge, and possibly for secret signaling.

HIGHEST ELECTRICAL RESISTANCE of any known material is reported for a new transparent and flexible plastic film, especially suitable for condensers. In addition to its remarkable insulating qualities, it is as strong as hard aluminum, highly resistant to impact and unaffected by heat up to about 400°. Called polyethylene terephthalate, it is chemically related to the synthetic fiber Dacron.

HIGH-SPEED JET SEAPLANES of secret and radically new design are to be built for the Navy by the Glenn L. Martin Co. . . . THE F-102, the country's first supersonic delta (triangular) wing fighter plane, is now in production for the Air Force.

$75-A-GALLON PAINT is finding a brisk market. A unique property of the Teflon finish makes it worth its high cost--practically nothing will stick to it. Manufacturers are testing it for coating bread-baking pans that will need no greasing and machine parts that glue cannot gum up, says the maker, du Pont.

FIRST GUIDED-MISSILE WARSHIP has been launched by the U. S. Type and size are hush-hush. Only hint: vessel is designed primarily for antiaircraft defense. It was known that the Navy was converting the 13,600-ton heavy cruisers Canberra and Boston into missile ships. Earlier, work had been suspended on the unfinished battleship Kentucky and battle cruiser Hawaii, pending perfection of plans to arm them with guided missiles.

THAT LITTLE CAR that Nash showed off two years ago, as what a $1,000 automobile might look like, is going into production. Powered by the Austin A-40 engine, a light sports model will be built in England for sale in the U.S. by Nash dealers. Deliveries are scheduled for late next year; price, not yet announced.

"DEODORIZING MATCHES," resembling ordinary matches but with heavily coated and elongated heads, are said to banish odors in a room and fill it with a pleasant fragrance. The minature incense sticks are lit by striking them on the side of their box, which holds 40. They are held in the hand while they burn.

*The Editors*



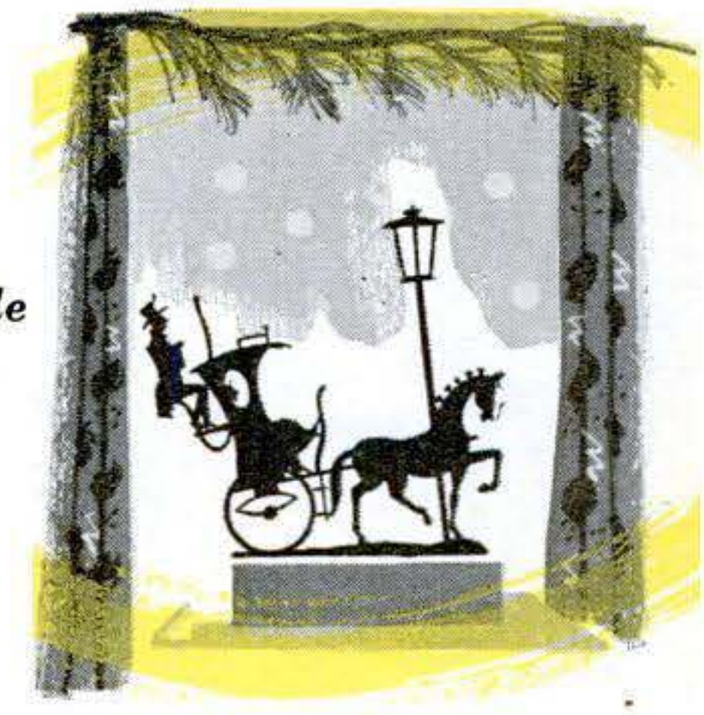
Copyrighted material

# Make Your Home a Christmas Card

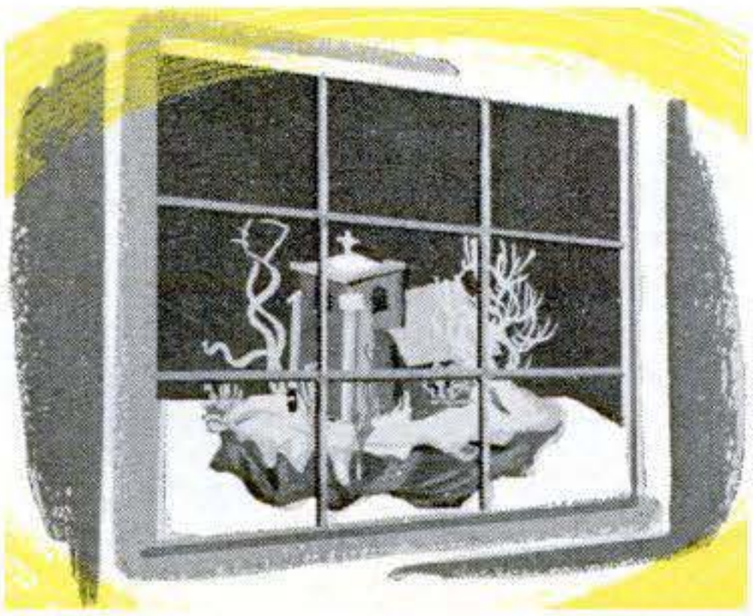
***Large-size decorations to liven up your windows take little time to make and will extend hearty holiday greetings to all who pass by.***

*Big smiling Santa is a whole set of separate colored cutouts—one for each windowpane—that can be easily taped to inside of glass.*

*This trainload of Christmas greetings set up on the front lawn is really going places—on wheels turned by an old phonograph motor.*



*Old-fashioned horse-and-buggy street scene is a simple cardboard silhouette with a tiny bulb in back to light the travelers' way on a wintry night.*

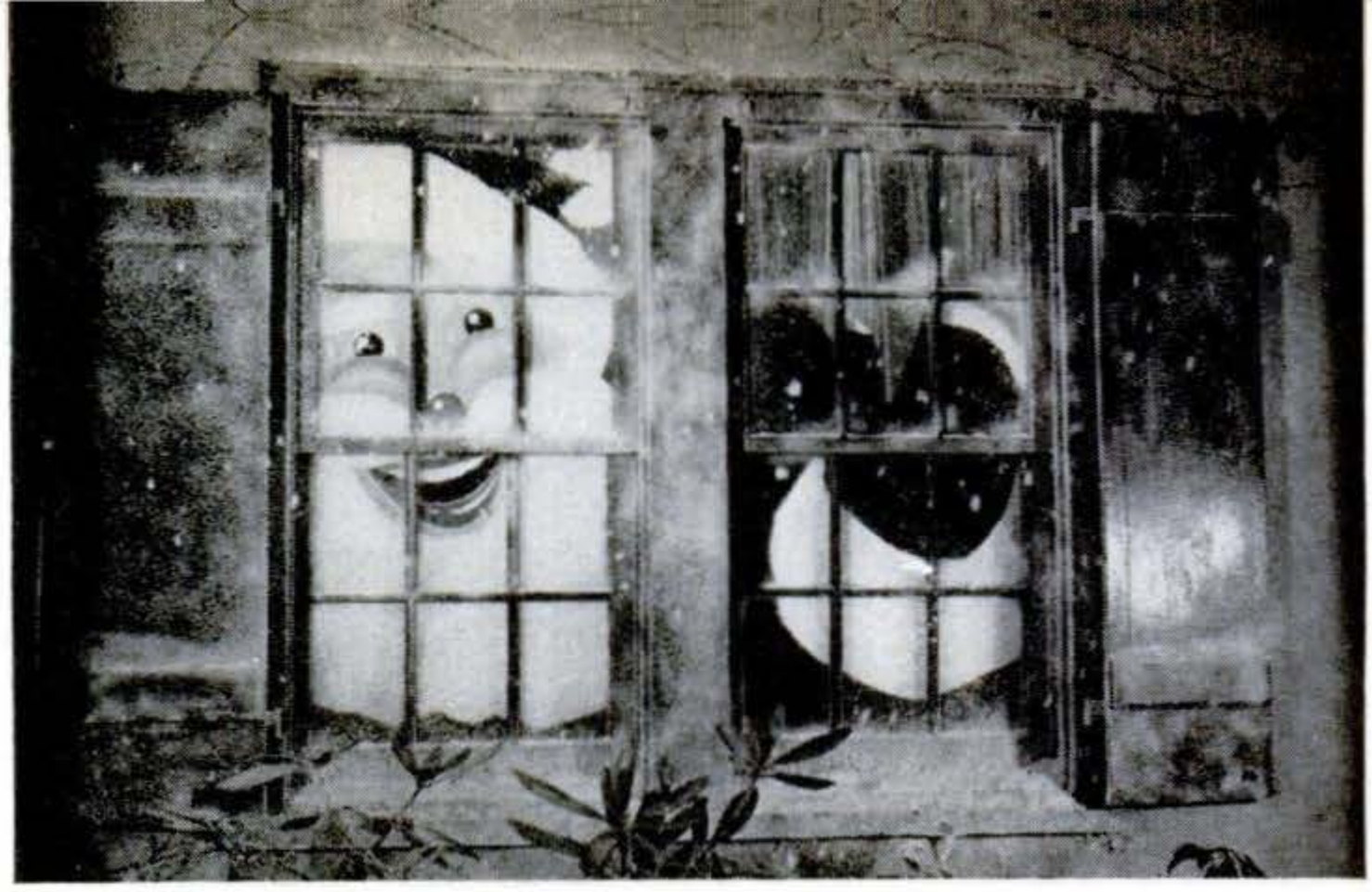


*Rags soaked in quick-drying plaster of Paris form a frosty hillside setting for a brightly illuminated Gothic church.*



Copyrighted material

# Super Santa Made in Sections Is Easy to Put Up and Take Down



HERE'S a natural for a pair of abutting, multipane windows. Santa peers out with a welcome as large as his eight-times-life-size head and waving mitten. Looking at him from the street you'd never guess that he is a many-sided personality, with each segment taped to a single pane of glass.

With the exception of a button nose and the whites of his eyes, Santa's face is painted in tempera colors directly on the surface of cardboard. The eye sections are removed, like those of a jack-o'-lantern, with a mat knife and backed up with tracing paper to let the light from the room behind them filter through. All of the white areas—whiskers, cuffs and cap trimming—are covered with cotton batting, and the red portions of the coat, mittens and cap are surfaced with colored felt. Use rubber cement to hold the material down. Unlike glue it will not leave a stain if it soaks through.

One of the advantages of this design is the ease with which its small parts may be stored away for use another Christmas.

**DRAW SANTA** on single sheet of cardboard (or several sheets butted together), then cut, removing strips the width of window moldings.

Copyrighted material

# Lights Blink and Wheels Turn on Animated Train

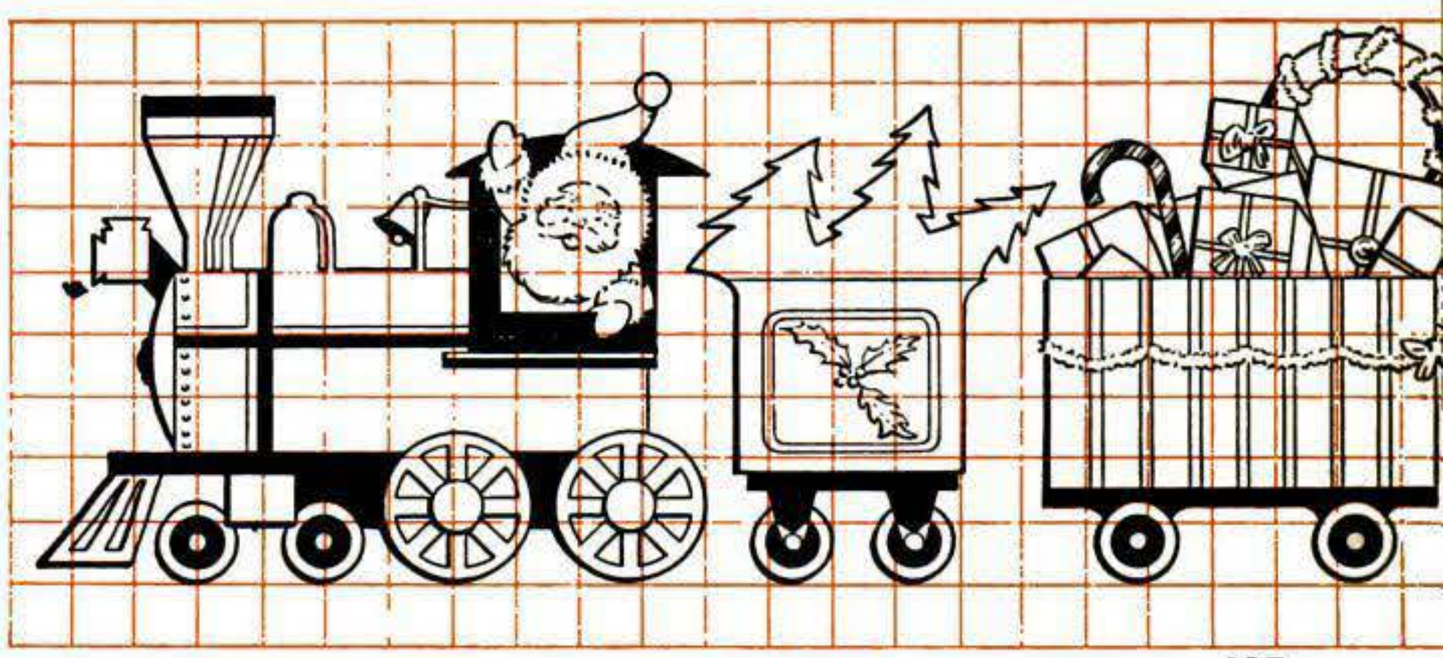
HIGHWAY traffic comes to a full stop when Santa makes his appearance in Morton, Ill., each year, riding high in the cab of a diamond-stack locomotive trailing a gondola-load of candy canes, wreaths and packages.

Robert Hawkins had an eye for the weather when he designed this jumbo outdoor card, which measures 67″ by 118″. Its husky, two-section framework, covered with heavy cardboard, is securely anchored to 2″ by 2″ by 16″ stakes driven into the ground, with further bracing supplied by heavy guy wires. Cardboard cutouts of the locomotive and cars are held away from the background by 3″ spacer blocks to produce a bold relief effect. This also provides space for an electric socket, blinker unit and bulb behind the "oil" headlight.

But the real gimmick is the motion of the driving wheels, which are turned by an old phonograph motor, directly coupled to the forward wheel, with a belt connection turning the rear wheel.

To make a logical smoke pattern of the lettering, the train has to run from right to left, and this calls for the phono motor to be reversed. Because all of these units are of the shaded-pole variety that is a simple operation, involving nothing but the removal of the bearings and a reversal of the motor pole piece. Remember that a wet snowfall can play havoc with moving parts and electrical connections. To avoid a "road breakdown," protect the motor with a boxlike housing.

Floodlights, concealed in nearby foliage, bring out the bright coloring of the red and green train, the metallic stars set against a neutral gray sky area, and the shimmer of mica sprinkled on the white "snow" behind the whirling wheels.

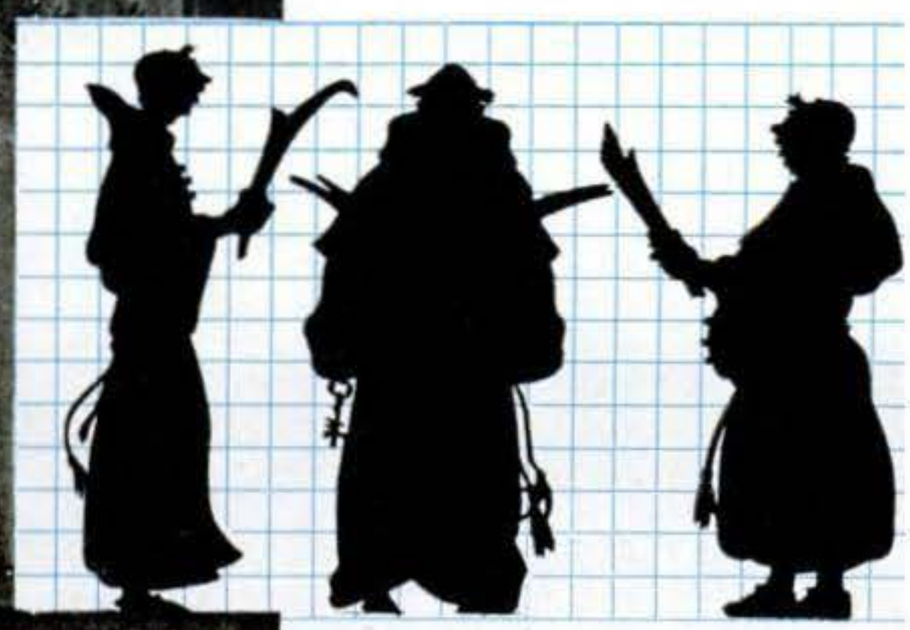


**Please turn the page for more Christmas ideas.**



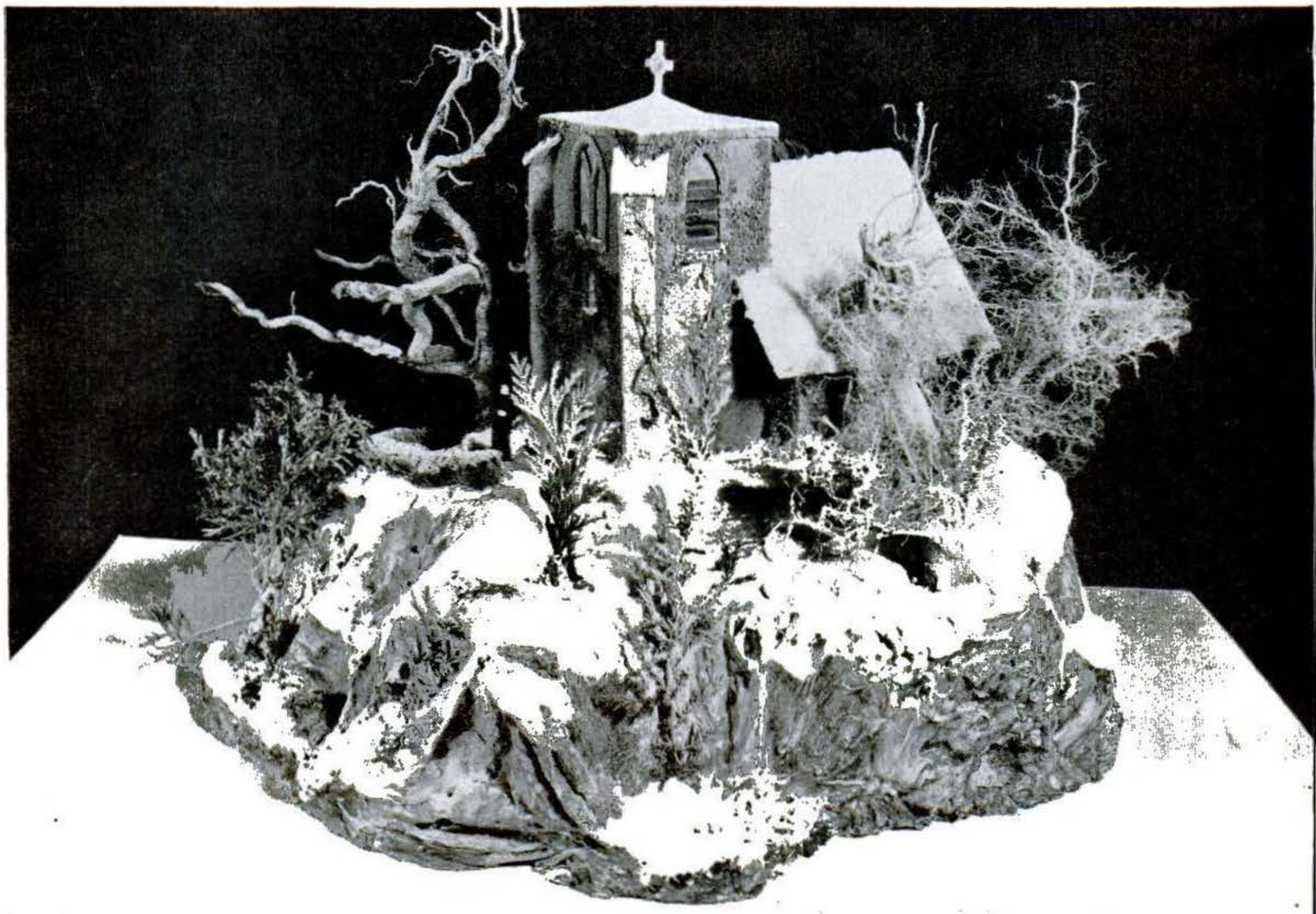
Copyrighted material

**SILHOUETTES** are back-lighted by two 30-watt bulbs in base and one 75-watt bulb behind pipe organ.



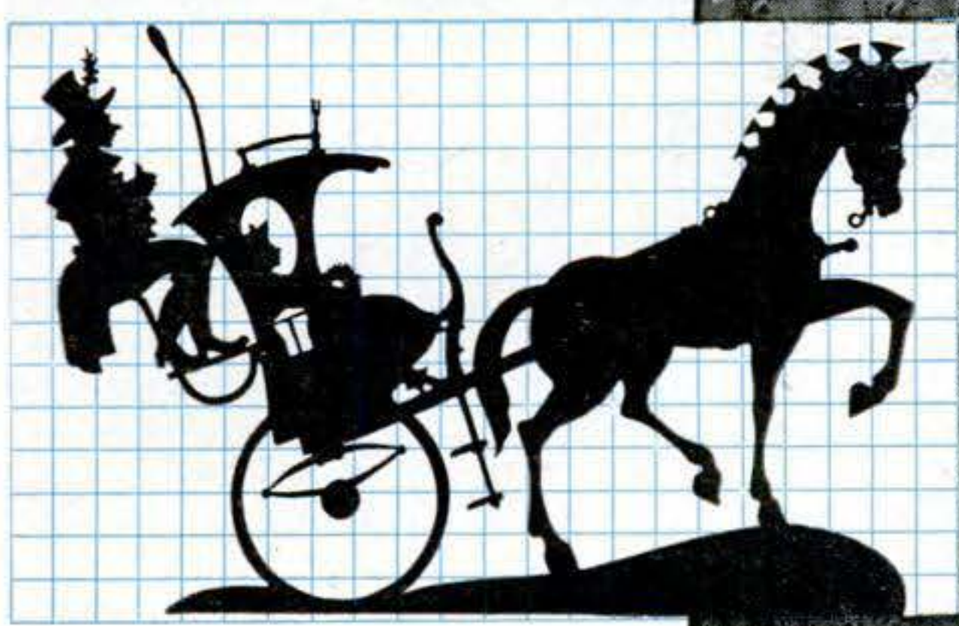
SILHOUETTES make simple and effective window Christmas cards when backed with dramatic lighting. In laying out a design, bear in mind that large masses of black are uninteresting unless relieved by a certain amount of open work and angular detail. The two designs pictured here are good examples of well balanced silhouettes, and can be scaled up without too much trouble.

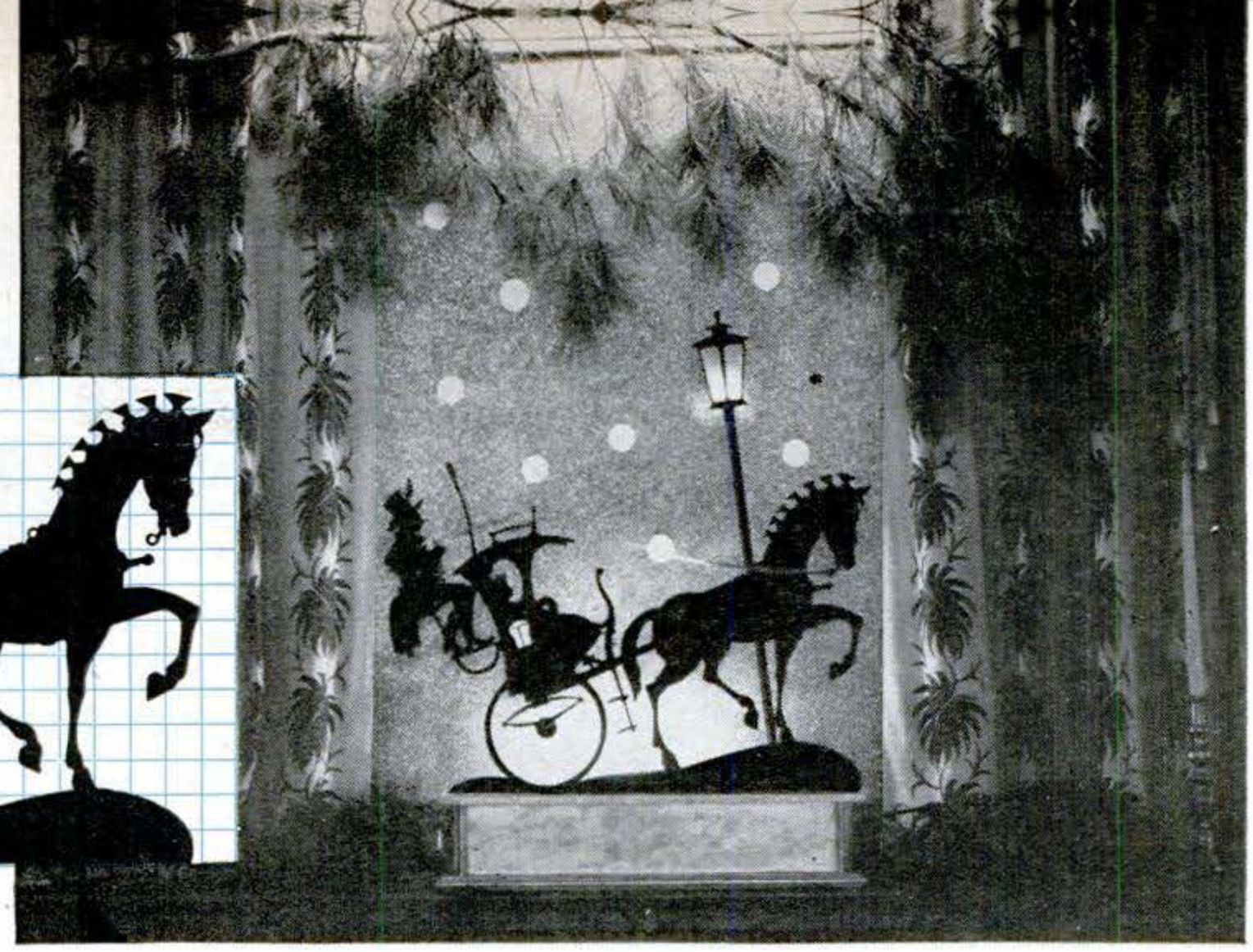
You may want to make your cutout of cardboard, but unless it is reinforced with light molding it will have a tendency to curl. If you have a jigsaw and a piece of





Copyrighted material





**STREET LIGHTING** is simulated by transformer-fed 8-volt lamp. Enlarge cutouts from squared drawings.

composition board you can turn out a more durable job—one which can be stored away for another Christmas.

In either case, the silhouettes should be painted a flat black—showcard color for the cardboard, oil paints for the composition board. A window free from a confusing crisscross of molding makes the best frame for the cutout.

For the background, use metallic paper illuminated by a bulb hidden in a small box at the base of the silhouette, or placed directly behind the cutout. Mica-surfaced roofing paper can also be used, and the shiny flakes suggest softly falling snow. Or you can work up a background set, like the pipe organ made of gilded mailing tubes shown on the adjoining page.

# Table-Top Church Is a Whole Show in Miniature

BEHIND that small window overlooking the porch, or placed atop your television set, this illuminated Gothic church will shed its Christmas cheer in all directions. The building is made of cardboard, shellacked and coated with gray sand. Bits of yarn form the vines, and the leaves are fragments of green crepe paper, sprinkled over re-shellacked areas. Window cutouts are backed with tracing cloth, allowing light from a small bulb to filter through.

For the landscaping rough out a light framework of wood. Next make a thin mix of plaster of Paris—about the consistency of cream. Saturate a number of old rags in the wet plaster and, working quickly, mass them around and over the framework to resemble rock formations and sloping earth. Use whatever plaster remains to cover the seams where the strips of cloth overlap. When the plaster sets, the rocky knoll will be a fairly rigid unit to which you can attach sponge-rubber hedges and trees made of inverted roots trimmed to shape.

Here, again, sprinkle sand over shellacked areas to produce stone textures. Sawdust makes good grass, but don't stain it green. Instead, work in tints of yellow and brown. You say you want to cover your model with snow, not clumps of dead grass? Then look at a typical winter scene and see how blotches of warm color liven up the white stuff, especially on steep slopes.

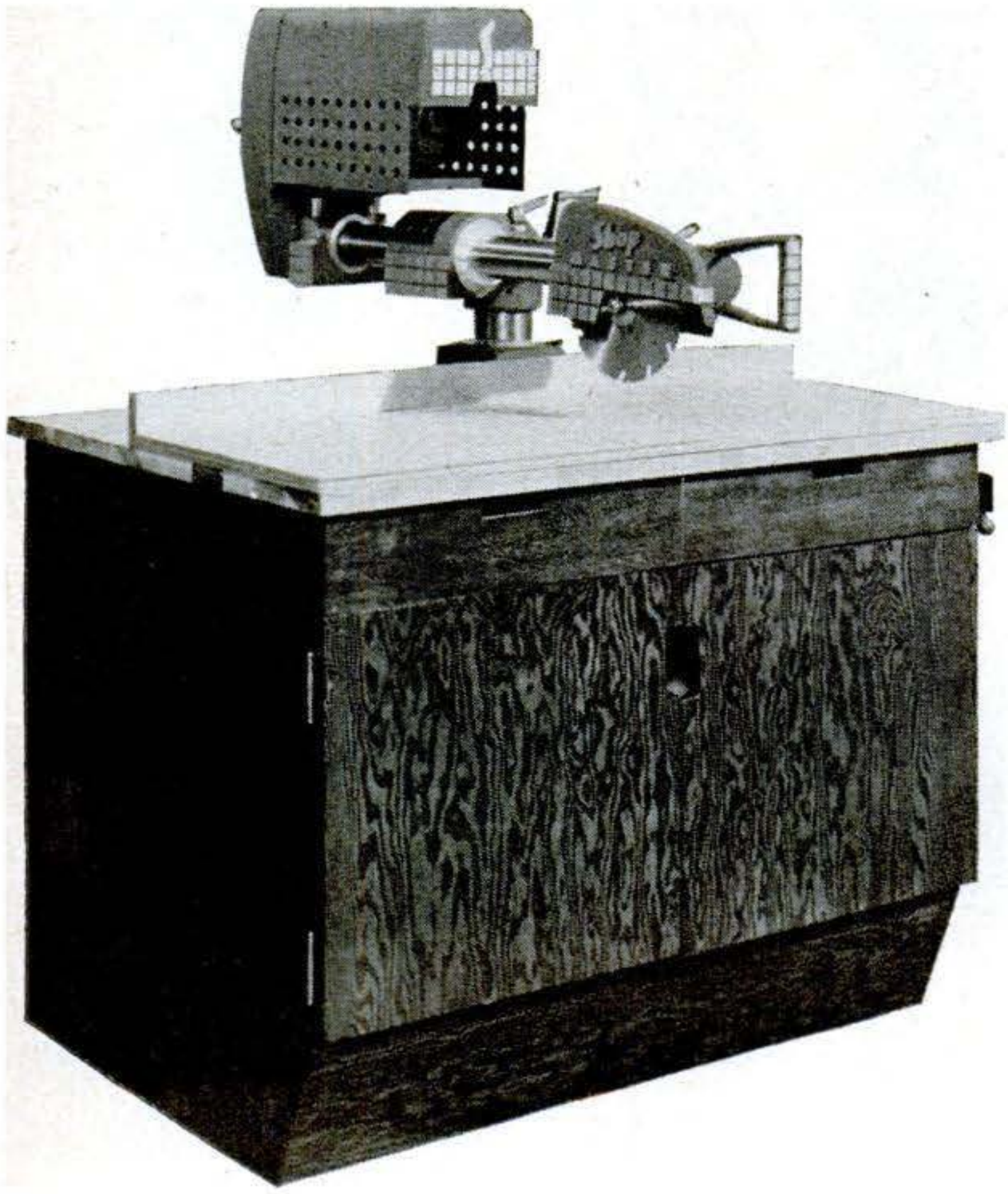
You are now ready to manufacture your own snowstorm, and you can cover as much or as little of the church and the hill as you like. After painting top surfaces white, get yourself an artist's atomizer—the kind used to spray fixative on drawings. Heat a pan of paraffin and, using the atomizer, spray the hot liquid over the model. The paraffin will turn white as it lands in tiny droplets. A light coat will resemble frost. Go on building it up and it will become wet, clinging "snow." Window areas, incidentally, should be masked during the operation to prevent them from becoming opaque. The little, black-robed figure in front of the door can be carved from a block of wood, or modeled of clay over a wire armature.

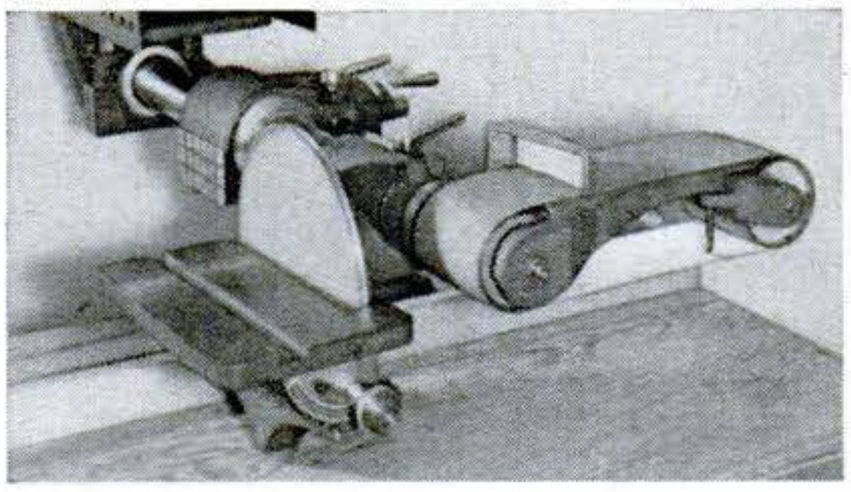
Want sound effects? There are plenty of good organ recordings. Hide a phonograph in the base—and there you are. END



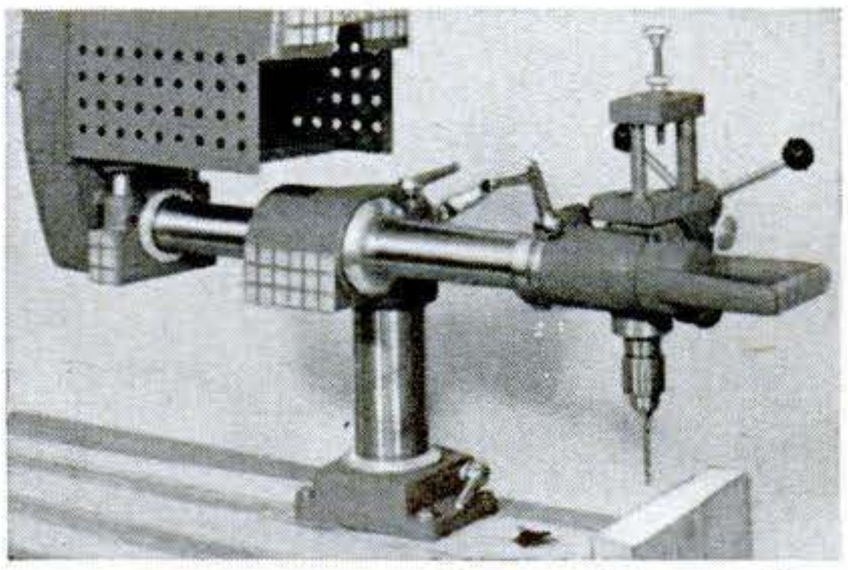
Copyrighted material

# 3 New Multipurpose Tools





**AS A BELT AND DISK SANDER,** it can be used horizontally or vertically. This attachment also can be used as a thickness sander.

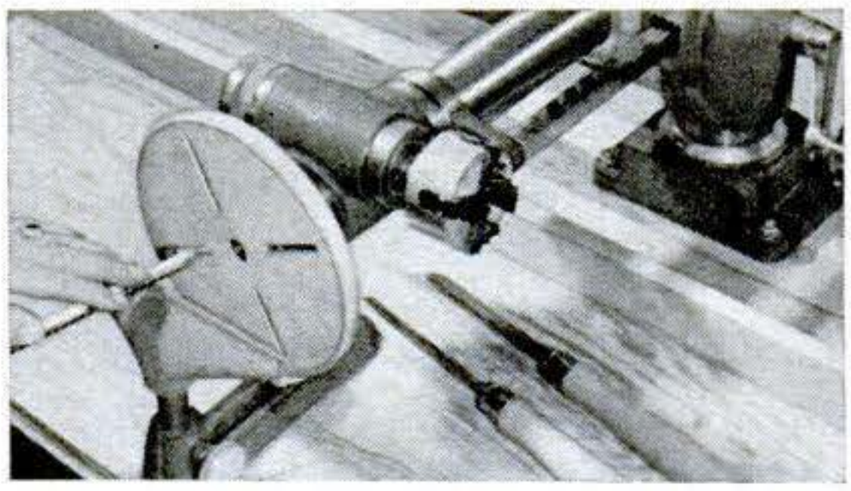


**AS A DRILL PRESS,** it can be used at any angle and an adjustable radius. This attachment has 3″ stroke, 18″ throat and can be used as router.

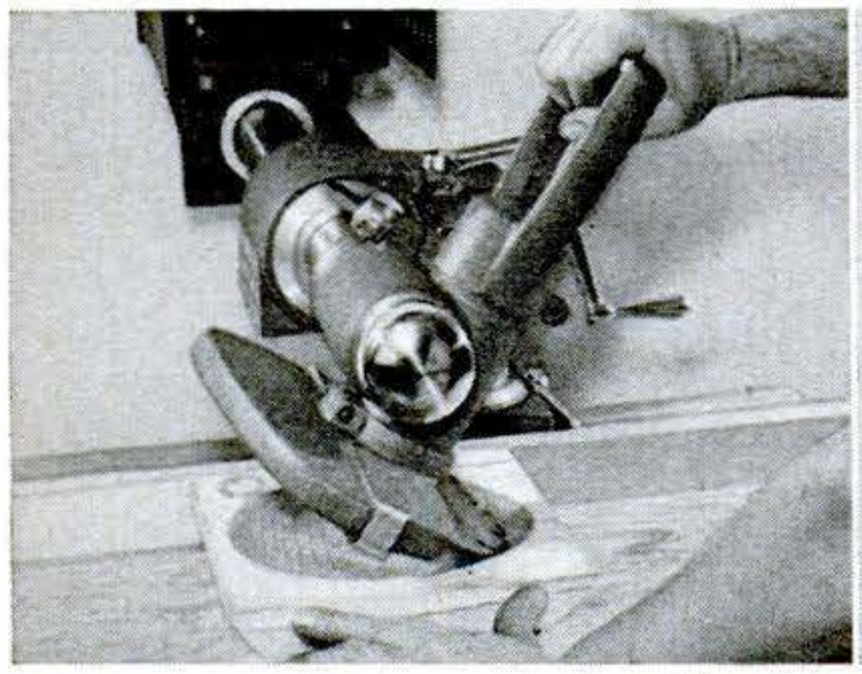
## You Can Carve with This Saw

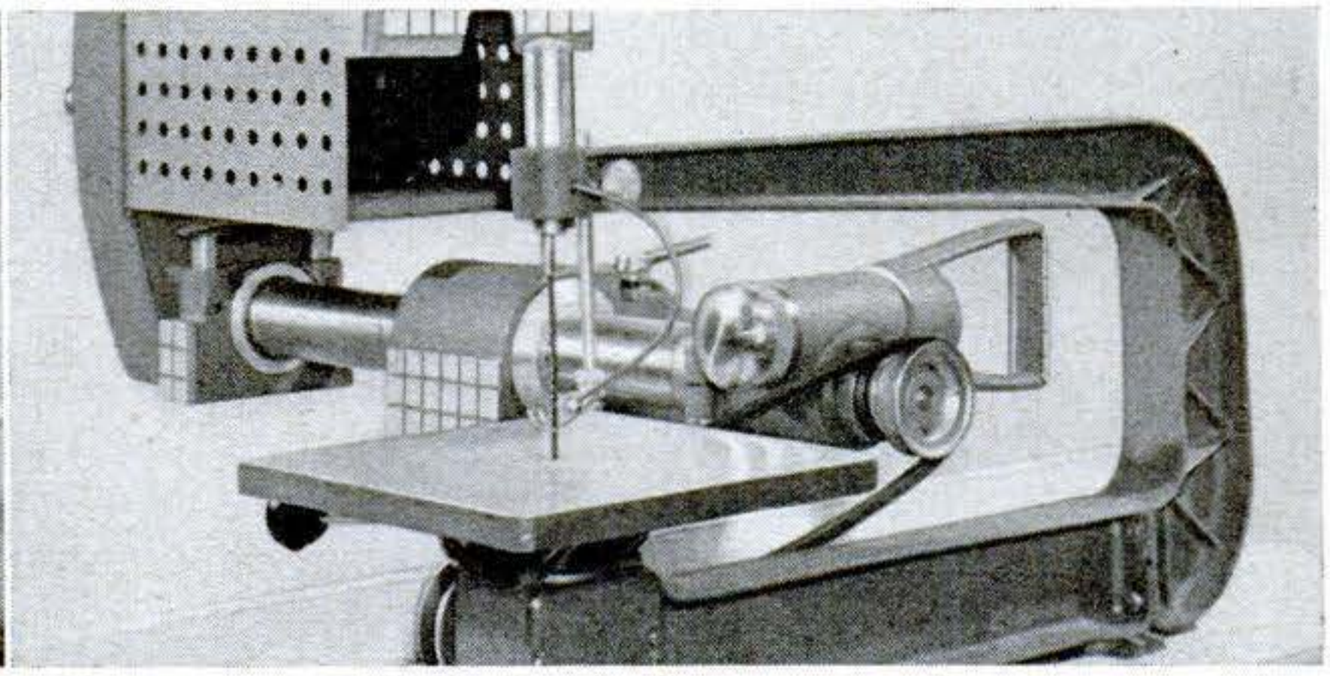
VISITORS to the New York Hardware Show this fall saw three new multipurpose tools. This one, starting out as a radial saw, can also drill, rout, sand, shape, grind, buff and do lathe turning. The saw blade can be used horizontally or vertically.

The ½-hp. motor drives through a four-step pulley and a shaft within the radial arm. Attachments can be powered from the shaft end or through a worm gear. Shopmaster is priced at $250, less motor, by Shopmaster, Inc., 1214 S. Third St., Minneapolis.



**AS A LATHE,** it will do faceplate turning or center turning. A tailstock, not shown, can be mounted for use with four-jaw chuck above.





**AS AN 8″ CIRCULAR SAW,** it will cut cup shapes as well as compound miters, cross cuts, rips and dadoes. The machine's depth of cut is 2 9/16″ (left). As a power plant, power take-off can drive other tools such as a jigsaw (right), jointer or a bandsaw.



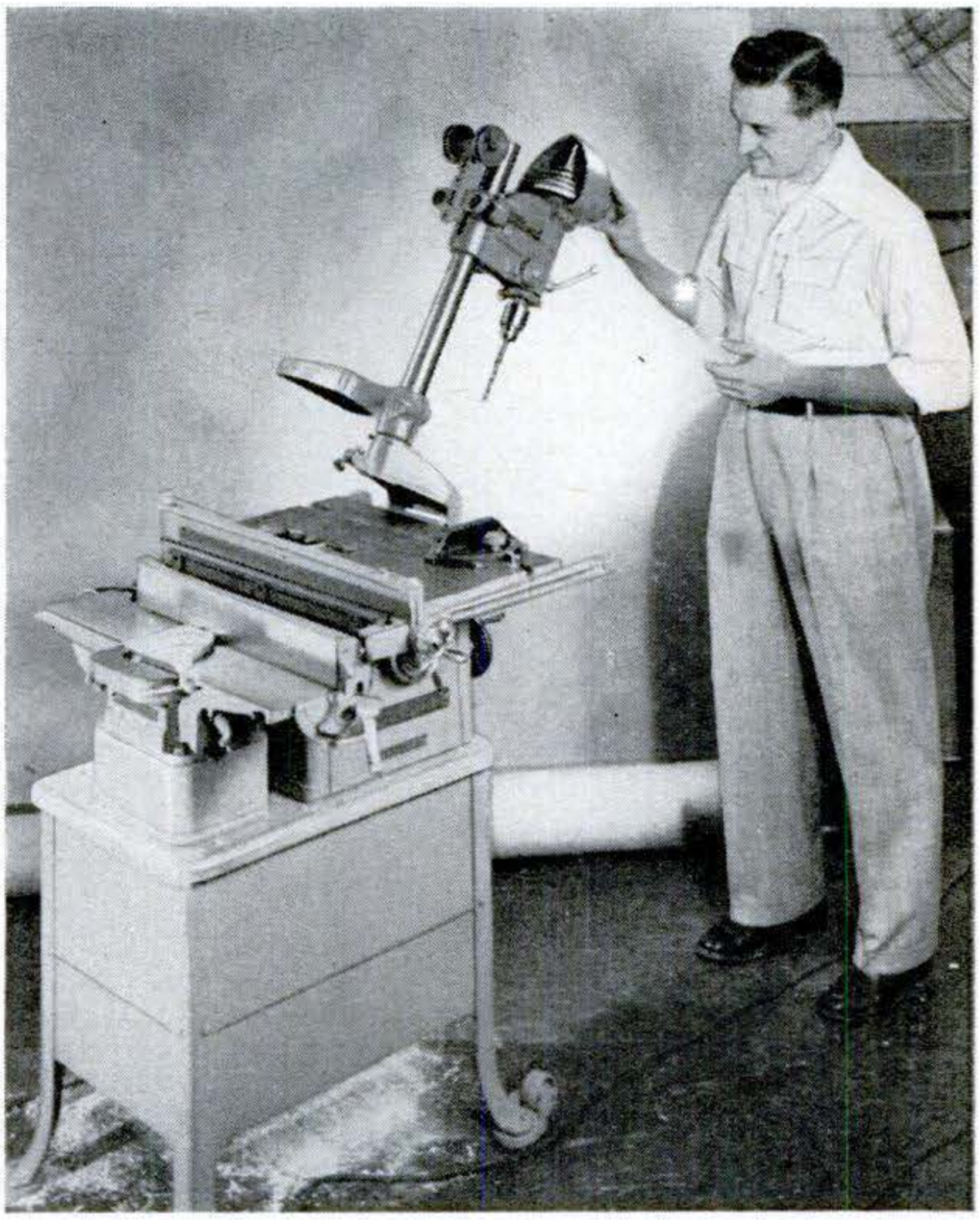
Copyrighted material

# Unveiled at Hardware Show

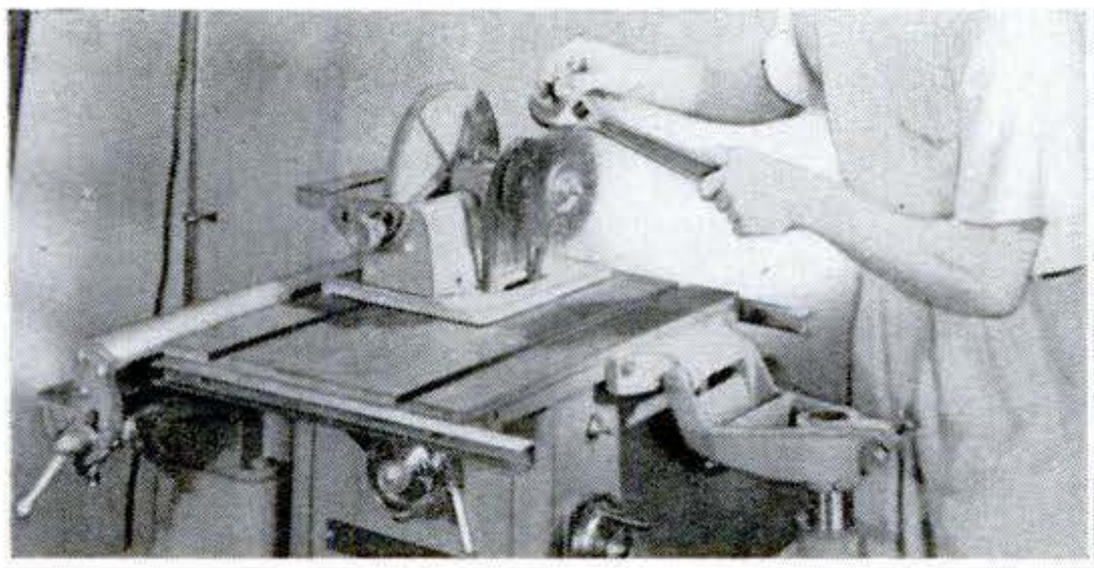
## You Can Take Apart This Combination to Make Four Tools

FOUR basic tools are wrapped up in this combination—a circular saw, jointer, sander and drill press. Yet the four tools can easily be separated and set up on their individual stands to form a four-tool shop.

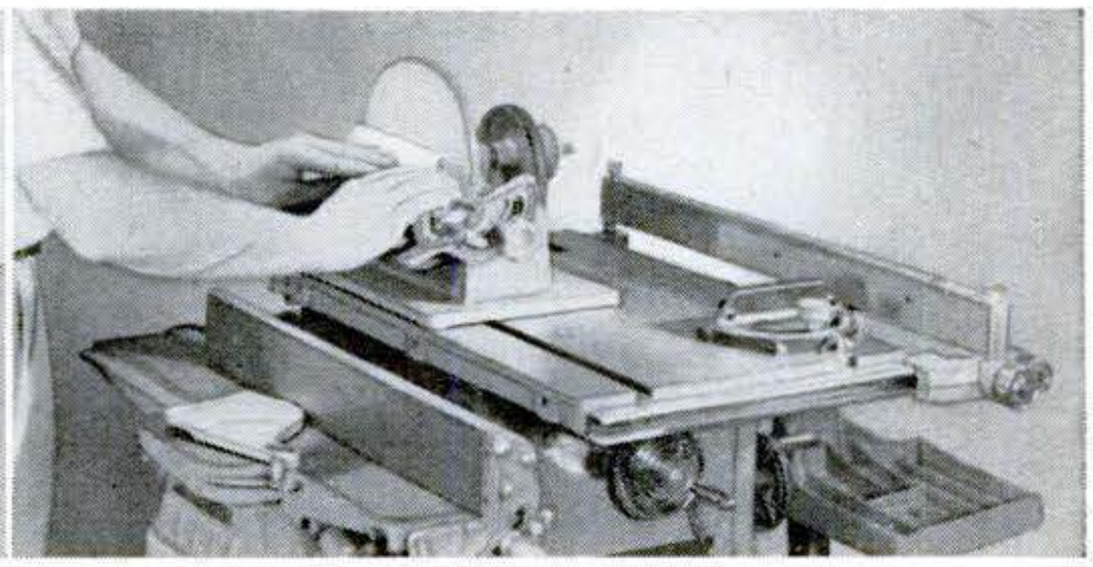
Deltashop occupies a 3′ square of floor space. It is priced at $210, less motor, by the Rockwell Manufacturing Co., 400 N. Lexington Ave., Pittsburgh, Pa.



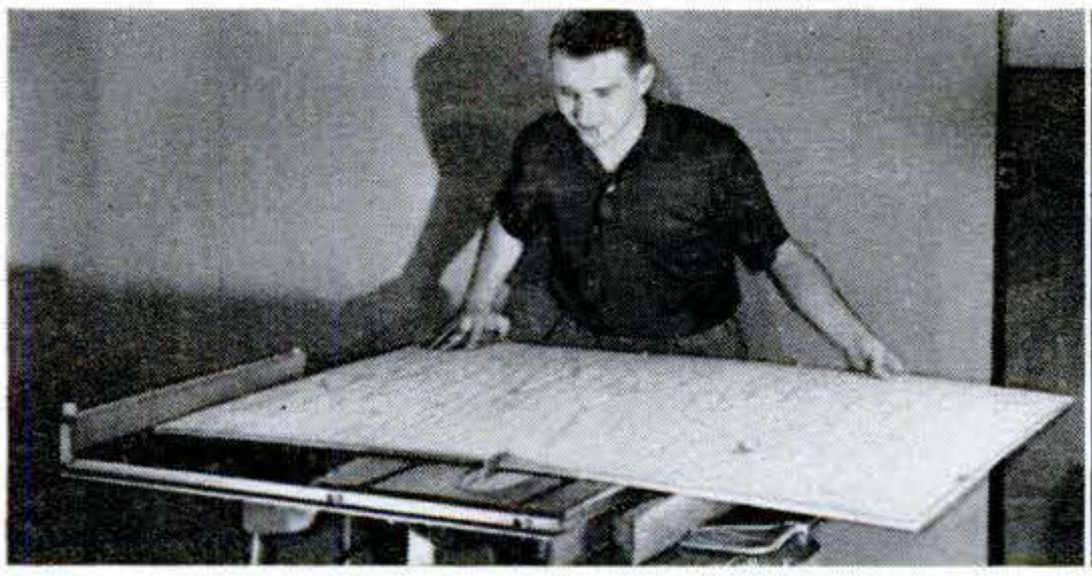
**DRILL PRESS, bolted and hinged to edge of saw table, swings into position. Belt from saw arbor drives 11″, four-speed press.**



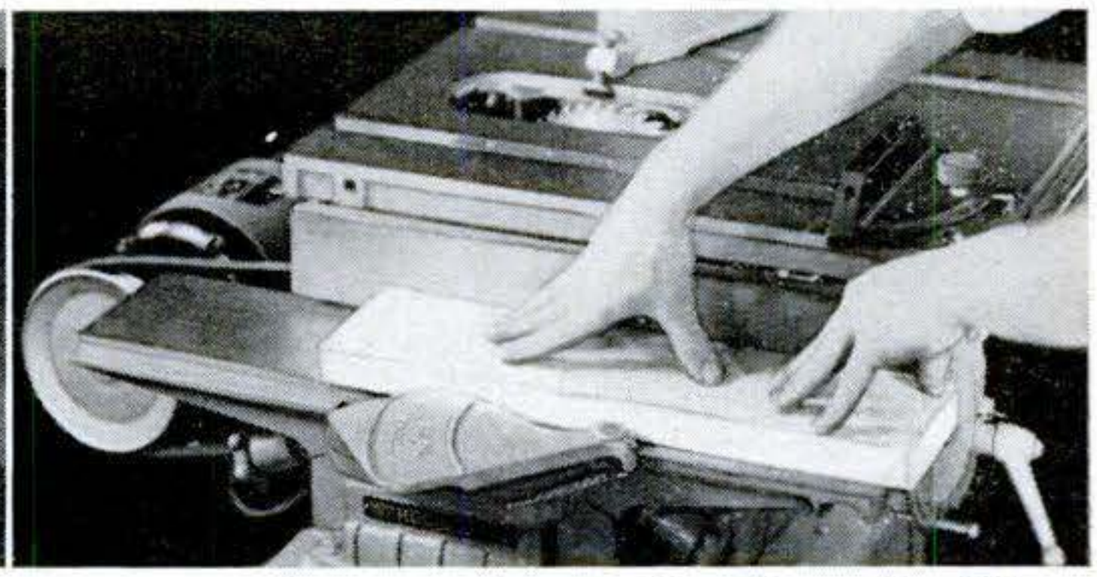
**WIRE-WHEEL SANDER UNIT mounts on saw table and is belt-driven. Grinding wheels or a drill chuck can be mounted on same spindle.**



**SANDING DISK is 8½″ in diameter. Tilting sanding table has calibrations, slot for miter gauge. Sanding drums also can be used.**



**CIRCULAR SAW cuts to center of 48″ panel and has an 11⅝″ working area in front of the 8″ blade. Saw is tilt-arbor type.**



**JOINTER planes surfaces 4″ wide and rabbets ¼″ deep. Fence is 3″ high, 20″ long and tilts left or right 45°. Both tables are adjustable.**

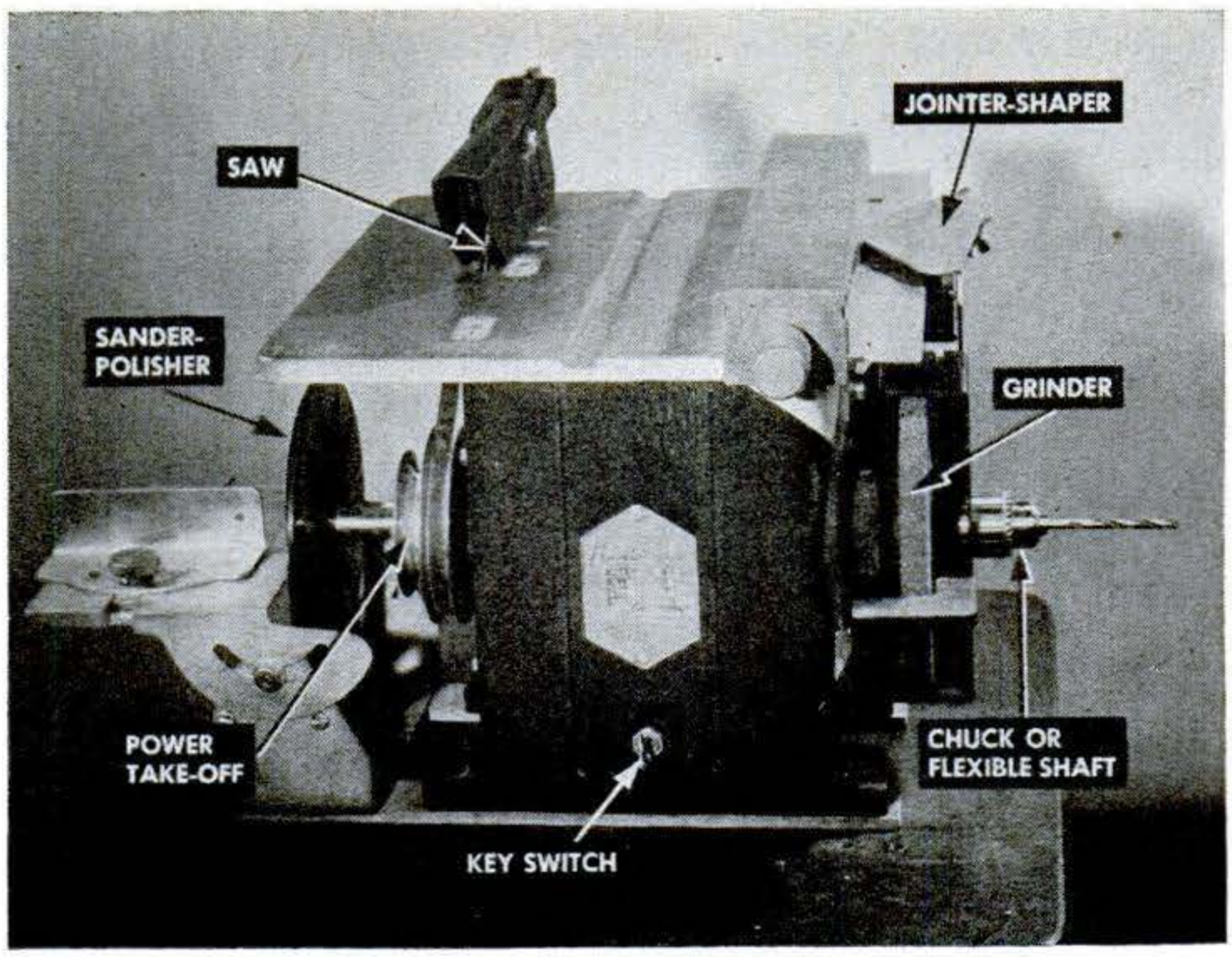
***Please turn the page to see another multipurpose tool.***



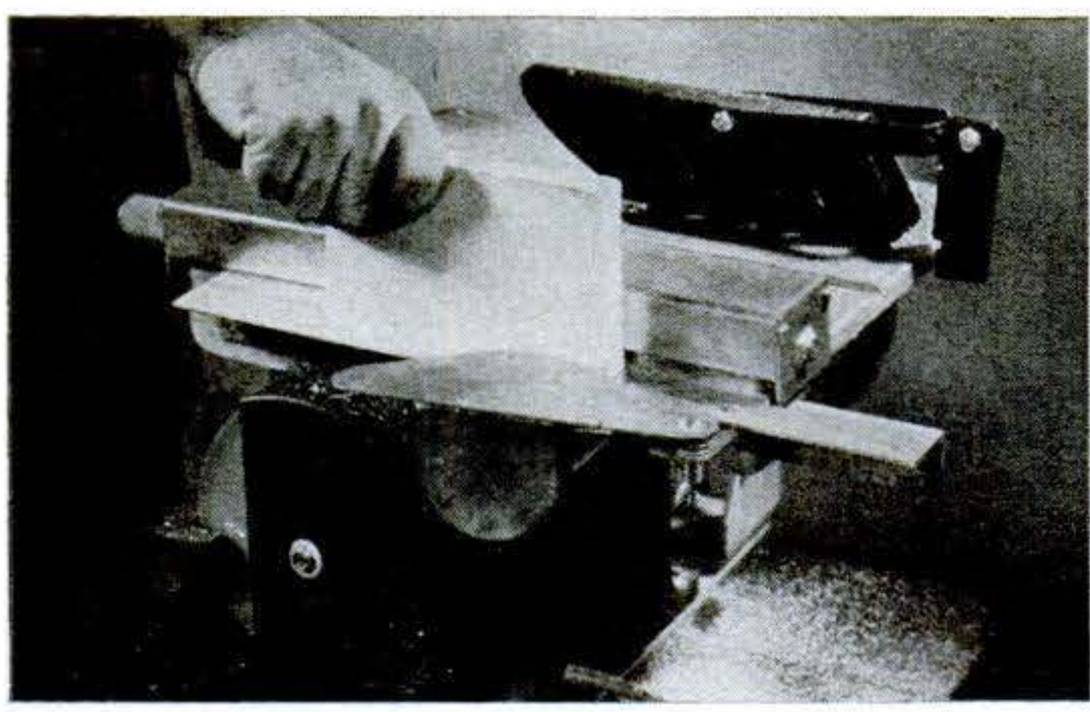
Copyrighted material

# You Can Park This Little Job in a Closet When Not in Use

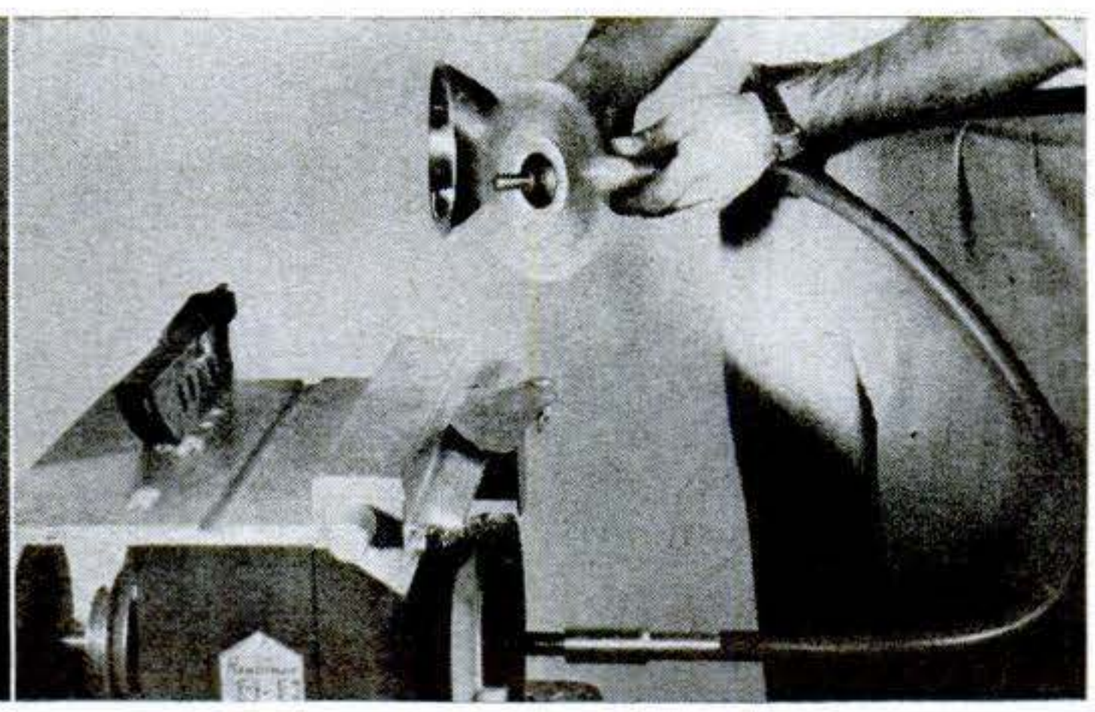
**MULTIPLE JOBS** this machine will handle are indicated at right. Tool measures 13″ by 15″ by 16″ and is powered by ⅓-hp. motor.



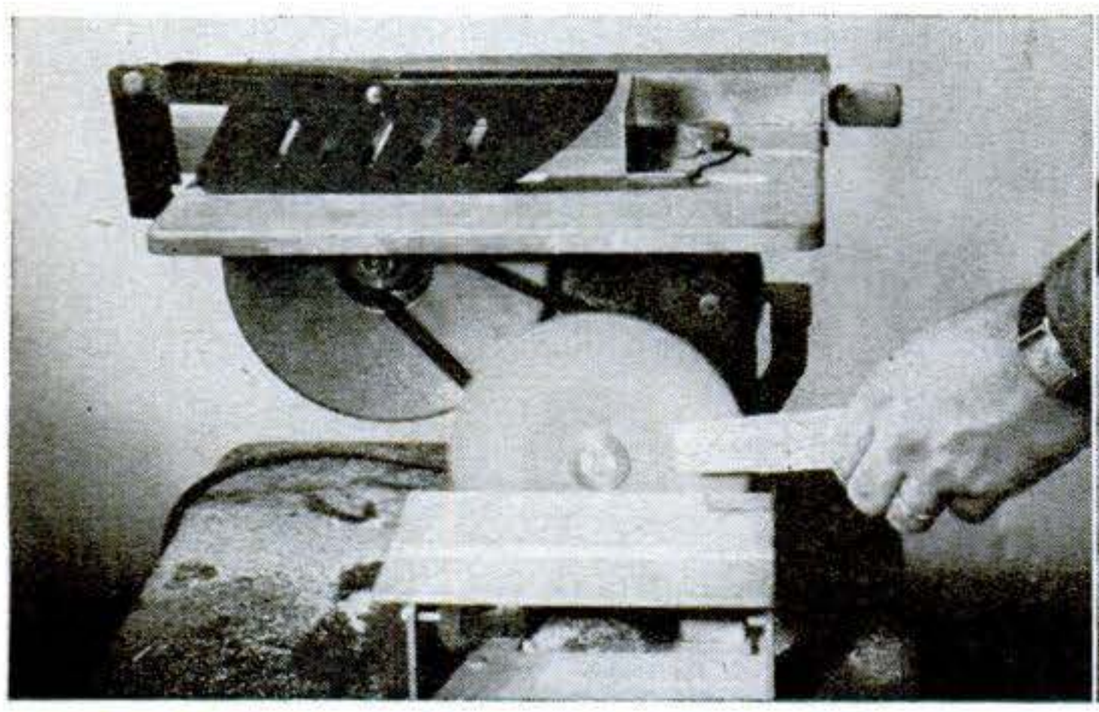

HERE is a compact, apartment-size unit that saws, grinds, sands, polishes, joints and shapes. You can stow it in a closet or sit it on a table or desk, since it weighs only 50 lb. The basic unit is priced at $75 and includes a 6″ combination blade, grinding wheel, sanding disk, wire wheel and a polishing bonnet. Accessory kits for the Handyman Shop range in price from $3.50 for a polishing-wheel kit to $18 for a flexible-shaft kit. The maker is Stanley Electric Tools, New Britain, Conn.



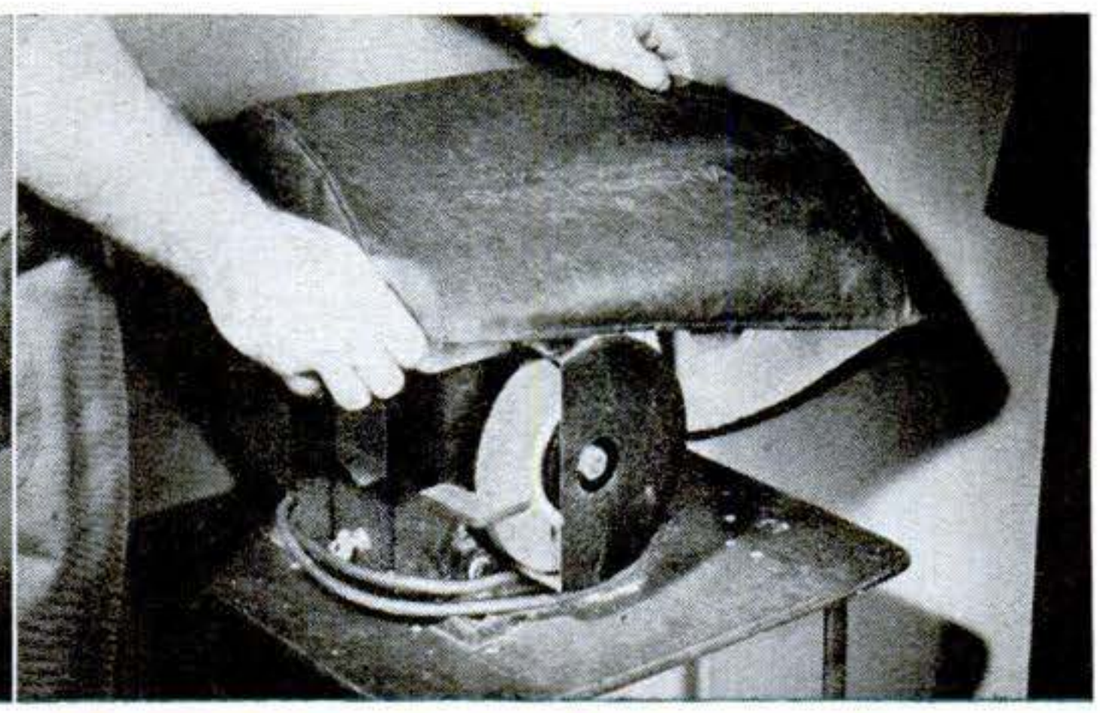
**JOINTER** will handle stock 1″ wide. Set of six shaper cutters are available as accessories to replace jointer cutter.



**FLEXIBLE SHAFT** attaches on same arbor as ¼″ drill chuck does. Chuck may be attached to end of 4′ flexible shaft.



**SANDING DISK** can be replaced by a 6″ polishing wheel. Table of sander is adjustable. Miter gauge of saw fits on table of sander.



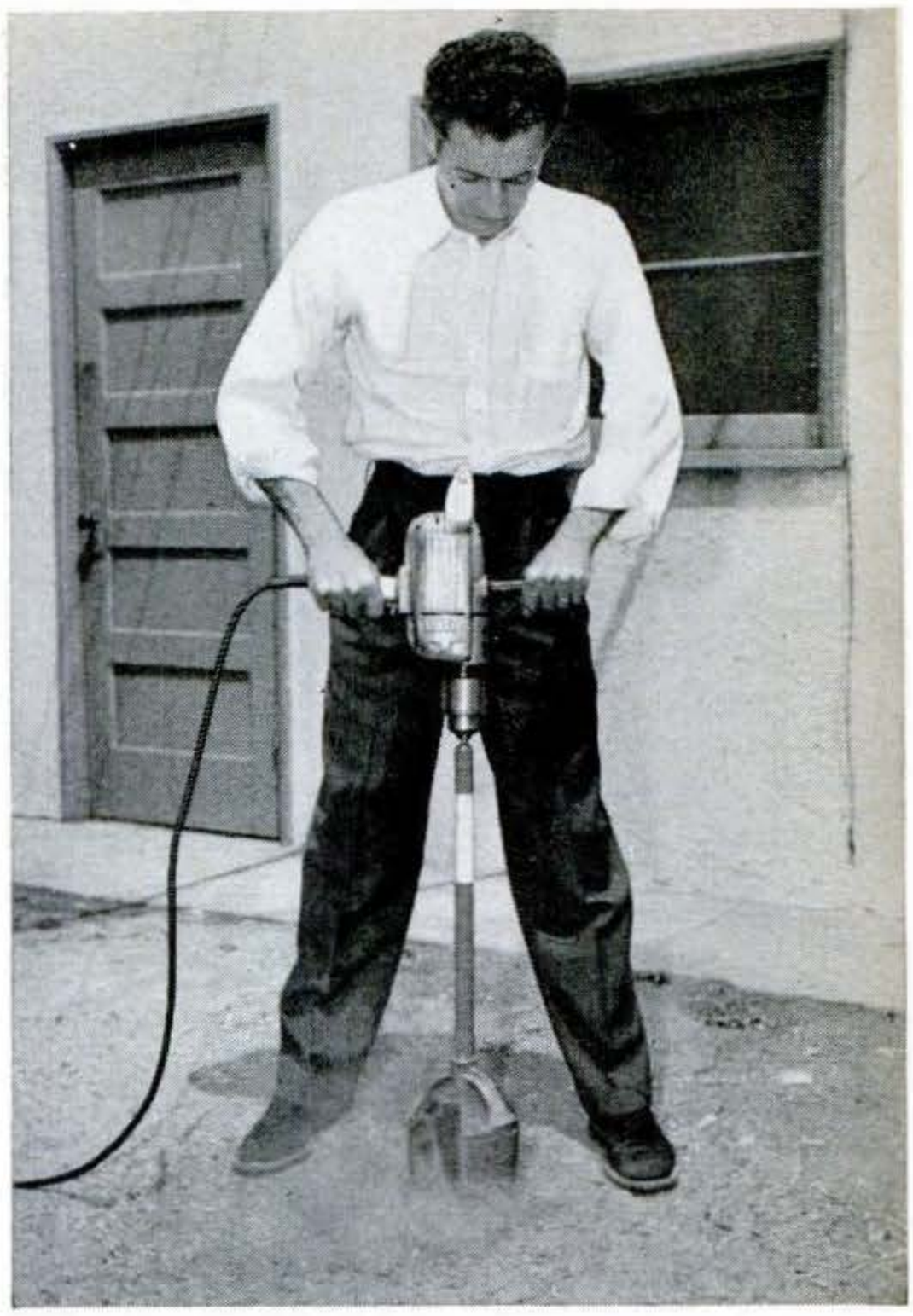
**SO COMPACT** a typewriter cover slips over it easily, tool cannot be started unless owner's key is inserted.



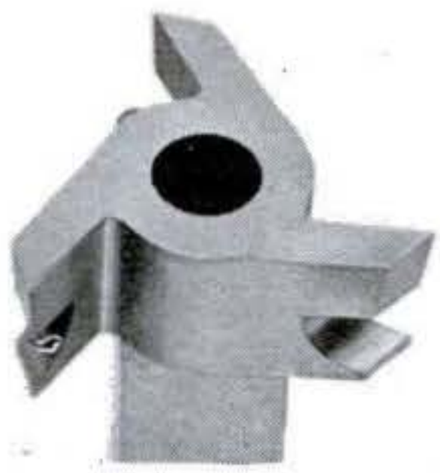
Copyrighted material

# New Tools

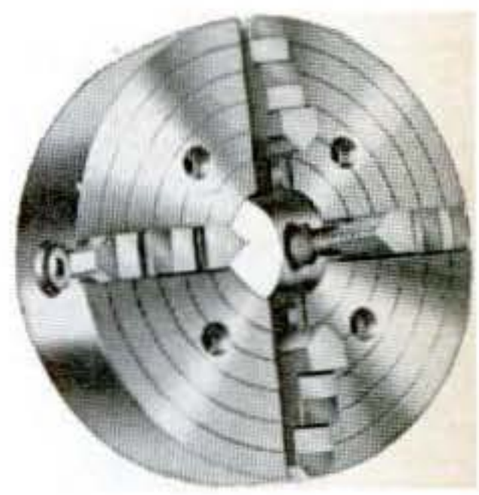
**1 Headlight.** Batteries and bulbs are included in a new light that fits on your head. It throws light where the wearer looks and frees both hands for work. Its makers suggest that Brow-Lite would be useful to plumbers, mechanics, handy men and doctors. It also serves as an auto trouble light.



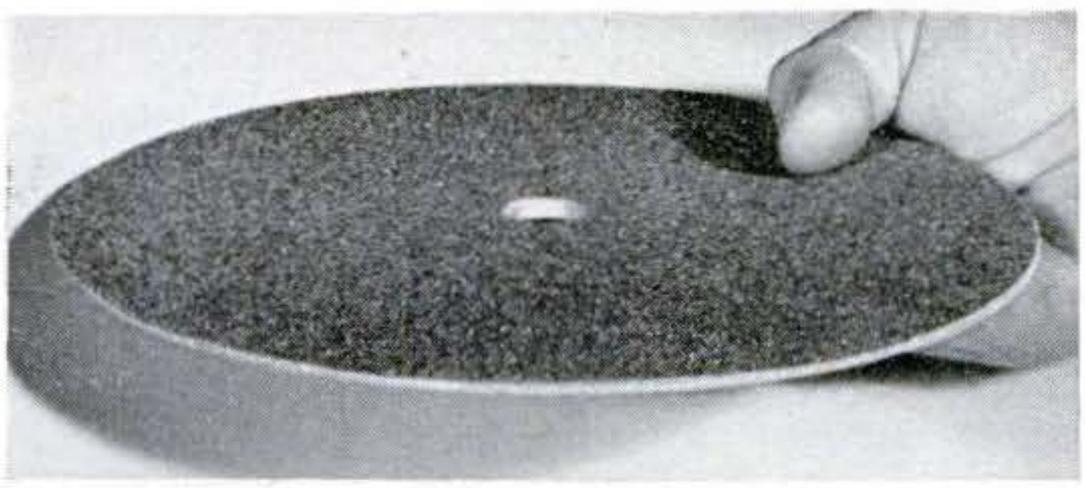
**2 Drill Runs Post-Hole Digger.** Lightening the task of making holes for fence posts, the digging tool above is powered by any electric drill of ½″ size or larger. A rotary cutting head on a shaft attached to the drill is said to do a fast, effective job in either soft or hard soil.



**3 Cutter Shapes Cupboard-Door Lip.** Lips on cupboard doors can be formed in a single operation with a three-wing shaper cutter. The tool is made in two styles—for use on a shaper and on a circular saw. It is made of high-speed steel and is available with or without carbide-tipped teeth.



**4 Chuck Cuts Down Overhang.** Because of the recessed back, this four-jaw chuck can be mounted to eliminate almost ⅝″ of overhang. This puts the work ⅝″ closer to the spindle, improving accuracy and permitting heavier cuts. The chuck is designed to be used with lathes of any size between 9″ and 16″.



**5 Sanding Disk for Saw.** You can feed work to this disk just as you would to a circular-saw blade. The tapered edge of the disk straightens out irregularities in the work, leaving it ready for gluing. One side of the aluminum disk is covered with coarse, open-coat aluminum oxide paper and the other side with fine.

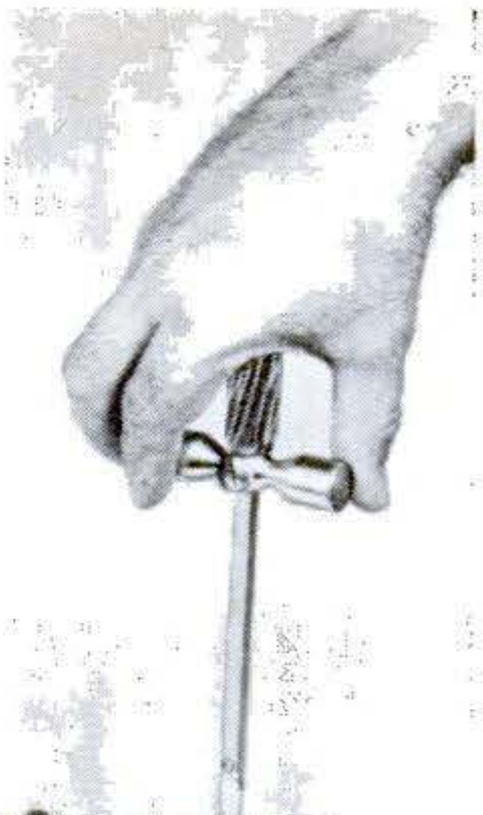
***Please turn the page for more new tools.***

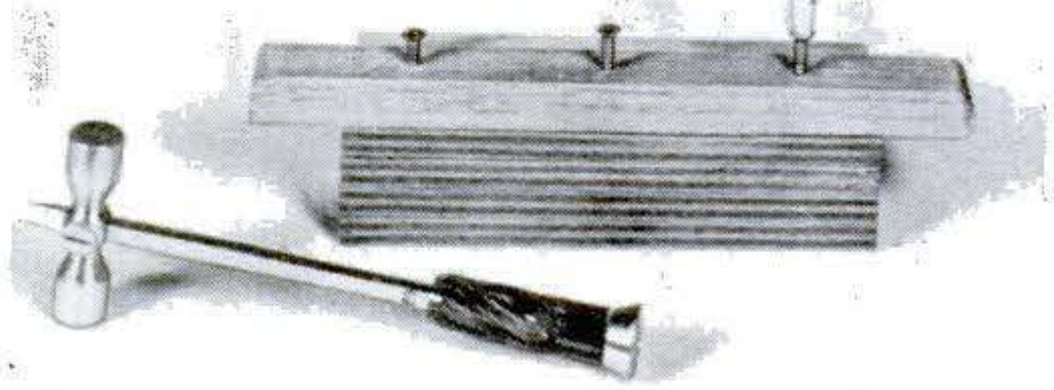


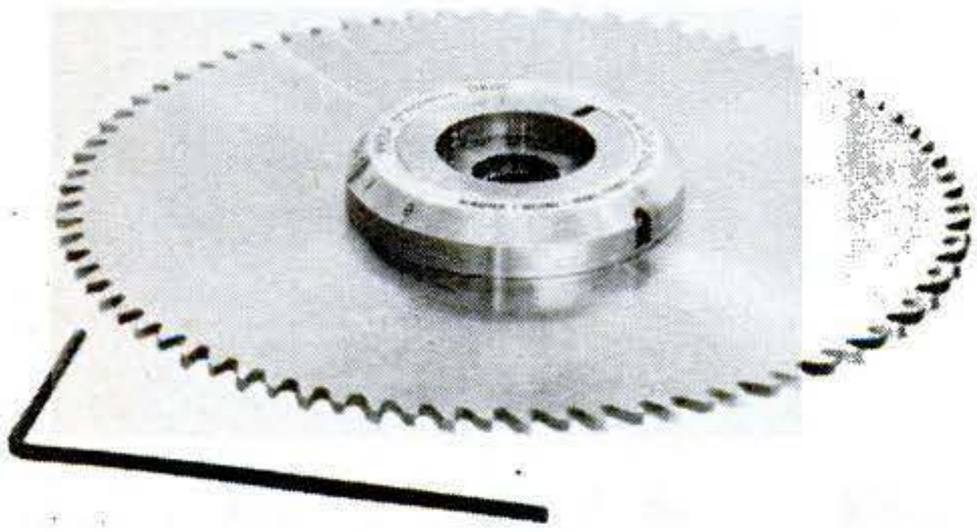
Copyrighted material

**6 New Jigsaw.** A low-cost, motor-powered jigsaw cuts to the center of a 16″ circle and will handle wood as thick as ½″ and soft metals as thick as ⅛″. The motor turns up 3,400 r.p.m. The price is $12.95 and includes 22 patterns for projects.

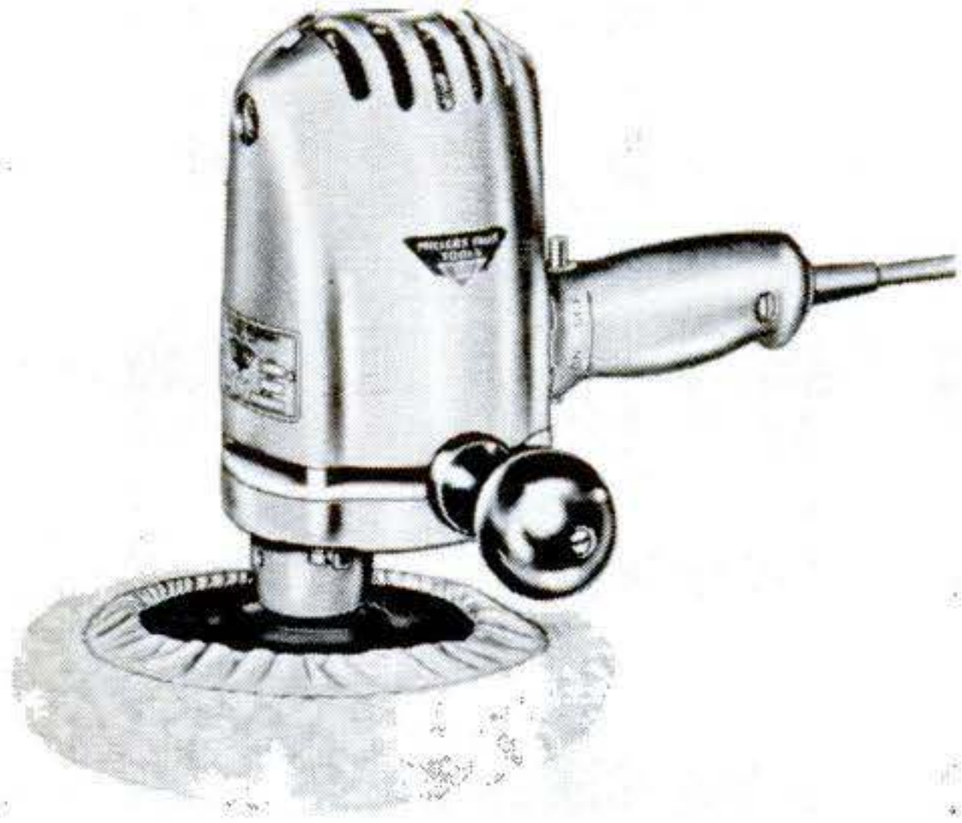
**7 Screwdriver-Hammer.** With its free-turning top resting in the palm of the hand, this tool serves at right as a T-handle screwdriver. Loosen a screw in the part between the fingers, and it slides to the other end and locks there to become the head of an 8-oz. hammer.



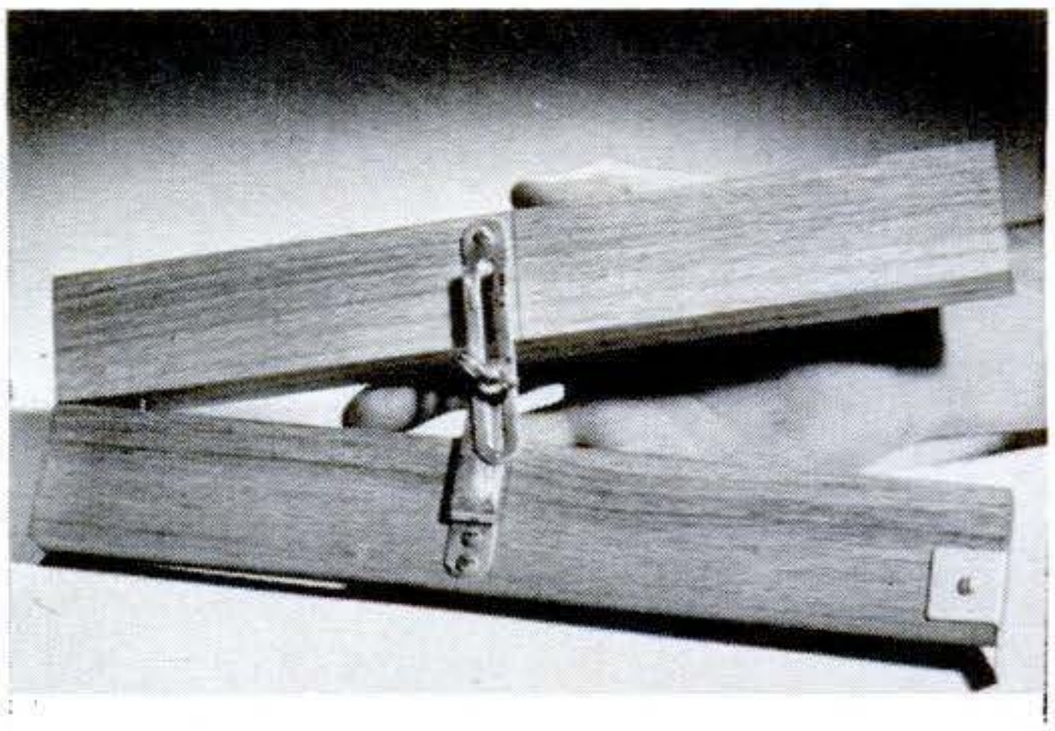




**8 Saw Blade Cuts Dadoes.** Adjustable gears in its hub convert this 8″ saw blade from a conventional one into an oscillating dado cutter for making slots or grooves in wood. Cuts of any desired width from 5/32″ to ⅞″, and as deep as 2″, are possible. To set the width, the wrench in the picture is inserted and turned in either of two hex sockets. The blade fits saws with ⅝″ or ¾″ arbors.



**9 Versatile Sander-Polisher.** A mirror-smooth finish is obtained when an orbital attachment is substituted for the 6″ buffer or sanding disk of the tool above. It does anything from rough sanding to finishing comparable with fine cabinetwork.



**10 Taper Jig.** This adjustable jig for cutting tapers on a circular saw is made of maple with arms 12″ long and 1¾″ wide. It will guide tapered cuts from 1° to 22°. For wider angles, the clamps can be relocated to move the arms farther apart.

*Further information on these products can be obtained from: 1. Read Enterprises, 29 Read St., Lowell, Mass.; 2. Eugene John Freeman & Co., Box 2143, Van Nuys, Calif.; 3. Woodworkers' Tool Works, 222 S. Jefferson St., Chicago, 6; 4. Buck Tool Co., 2015 Schippers Lane, Kalamazoo, Mich.; 5. Maynard D. Lee, 100 Chestnut Hill Dr., Rochester 17, N. Y.; 6. Burgess Vibrocrafters, Inc., 180 N. Wabash Ave., Chicago 1; 7. Spindriver, Box 1911, Los Angeles 36; 8. Magna Engineering Corp., Menlo Park, Calif.; 9. Millers Falls Tools, Greenfield, Mass.; 10. Hobbyist Adjustable Jig Co., 90-29 184th Place, Hollis, Queens, N. Y.*

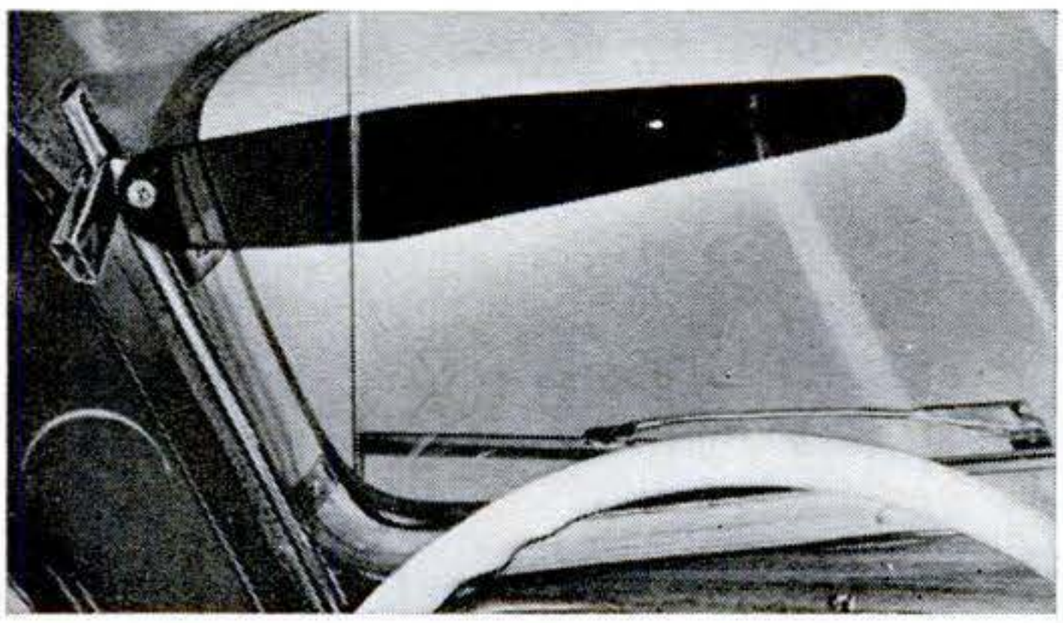


Copyrighted material

**Pistol Cleans Windshield.** A water pistol molded of plastic squirts liquid around the corner from the driver's seat to clean the windshield as the wipers work. The Misto-Matic reservoir holds enough water for a hundred washings, or it can be filled with a special deicing fluid. With the curved nozzle detached, the unit will slip into the glove compartment. *Products Research Inc., 171 Newbury St., Boston 16.*

# See Where You're Going

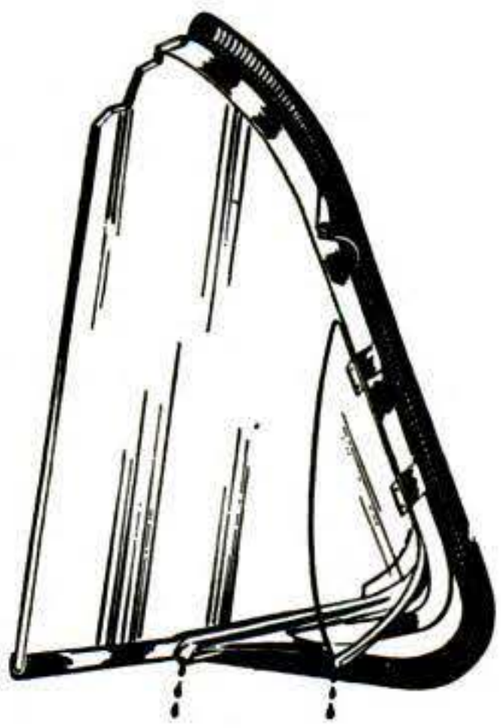
***New car accessories improve driving vision in sunshine and storm.***



**Filter Reduces Headlight Glare.** Screwed to the windshield molding, this colored plastic filter intercepts the beams of blinding headlights, yet gives vision past it. The filter slides up and down on a metal post to suit the vision height of individual drivers. *Olocar Light Controls Co., Box 23, La Grange, Ill.*

**Regulator Peps Up Wipers.** This new control is claimed to keep the blades going longer when the engine is under load, for instance on a hill. It evens out blade operation and ends racing of the wiper motor and blade whip at the end of stroke, thereby reducing wear. It is installed in the vacuum hose between the manifold and wiper motor. *Anderson Co., Gary, Ind.*

**Rain Diverters Prevent Fog.** If you like to drive with the vent wings open to prevent the windshield from fogging, here's how to keep the rain from blowing in. This new accessory, made of plastic and chrome, is designed to allow air to enter while carrying off the water at the two points indicated. *Anderson Lighting, 6341 S. Ashland Ave., Chicago.*

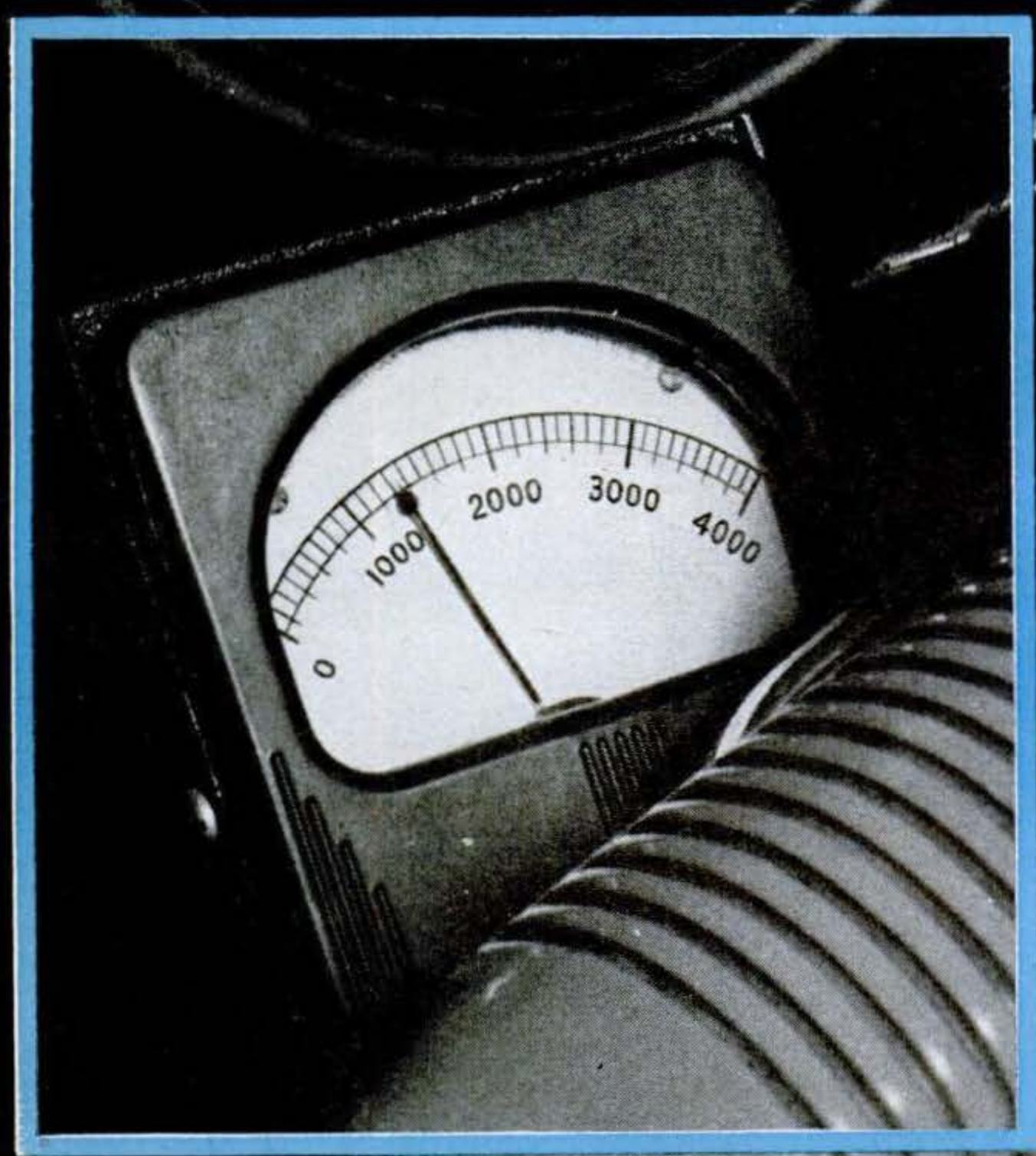


**Plastic Strips Off Ice.** A flexible plastic protector strips ice or snow off the windshield of your car after it has been parked in the open. A cloth edge keeps the plastic from tearing. The car doors are closed on the ends of the guard to hold it firmly in place on the glass. *Central States Paper & Bag Co., St. Louis.*



Copyrighted material

# How to Build a Rev Counter for Your Car




## Why a Tachometer?

Copyrighted material

# Wonder how high the engine in your car winds up? This homemade $16 tach tells you.

**By Howard G. McEntee**

MANY racing drivers say that a speedometer is of little use to them—but they practically drive by the tachometer. Pilots and speedboat drivers agree that the tach is *the* indispensable engine instrument.

Now I have no intention of racing the family sedan, but I am curious about how high my engine winds up during acceleration through gears and at cruising, and what an automatic transmission does to the r.p.m. There are commercial tachs that will show all this, of course, but their $40-$55 tags stopped me cold. So I built my own.

***It's a honey.*** You connect it with just one wire to the distributor or coil. It has no effect on engine performance and takes only a tiny amount of juice. Except for the meter it has no moving parts, and there's no dry cell to replace. The readings are "linear"—quarter-scale is 1,000 r.p.m., half-scale is 2,000 r.p.m., and so on.

It is made of ordinary parts, available from the radio mail-order houses, and will cost you about $16 if you have to buy everything. You don't have to be a radio expert to build it; a friend who is a novice with a soldering iron put his tach together in an evening.

***Kinds of tachs.*** My first plan was to get an extra speedometer and link it by flexible cable with some rotating part of the engine ahead of the clutch. The tough job was to find this part. Using the camshaft would have called for fussy machining. Rigging a drive off the generator, water pump, or even fan belt would be awkward.

My next try was to work out a generator-type electrical tach. In this deal the engine spins a tiny generator especially designed to put out juice in exact proportion to its speed, with the output shown on a dash meter. But this didn't work out either: the equipment is costly and there's still a mechanical-drive problem.

Next I studied commercial tachs. One uses an ingenious switch or "sending unit" under the distributor cap, and another links the distributor to a "transmitter" that has a special high-speed isolation relay. Borrowing from these fine instruments was a little beyond me.

***Circuit requirements.*** I jotted down what my circuit would have to do: 1. It should count the pulses in the ignition primary and report the rate on an inexpensive meter. 2. It should be accurate over the 450- to 4,000-r.p.m. range. 3. It must not affect engine performance. 4. It must not itself be affected by variations in battery voltage, plug gap or point setting—none of which is constant, even in one engine.

***Test rig.*** On the workbench I put together a testing lash-up consisting of a standard coil and a distributor, spun by a variable-speed electric motor. An old mechanical tach gave comparative readings. This contraption isn't necessary if you build a tach like mine, but it is handy for experimenting.

***Construction.*** Decide first whether the meter is to be mounted separately or the whole unit is to be fitted in a single box. If you have a centrally located dashboard clock that's on the fritz—as many are—the meter may go nicely in its hole. A clamp bracket that secures the meter to the steering column is also neat.

For ease of wiring, all parts but the

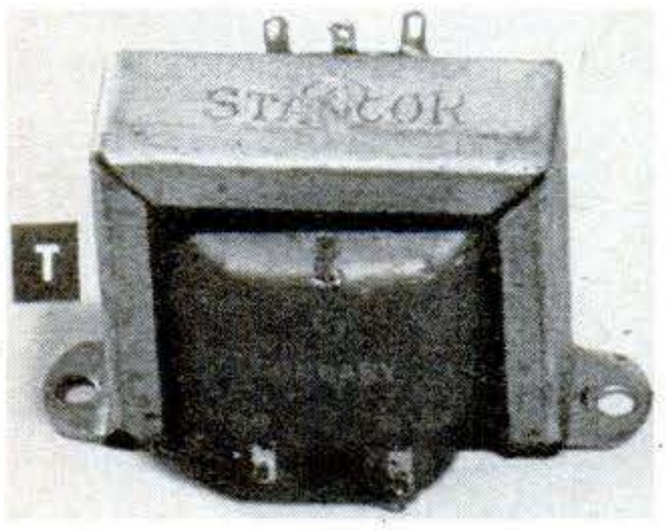
**A TACHOMETER is standard equipment on racing and sports cars, aircraft, and speedboats. It continuously reports how fast an engine is turning over. Installed on your car, it . . .**

- **Reminds you to keep engine speed in the ranges for maximum fuel economy and engine life;**
- **Tells you when you let the revs climb too high, either on acceleration through gears or downhill engine braking;**
- **Demonstrates, on cars with automatic transmissions, how bad driving habits can make the engine wind up excessively;**
- **Helps you to tune your engine precisely, and reveals how different adjustments affect speed;**
- **Allows you, when utmost performance is needed, to "shift by the chart" like a racing-car driver. It tells you when to shift gears to hold engine speed near favorable parts of its torque and horsepower curves.**



Copyrighted material

# These Are the Parts You Need




STANCOR A4352 LINE-TO-GRID TRANSFORMER

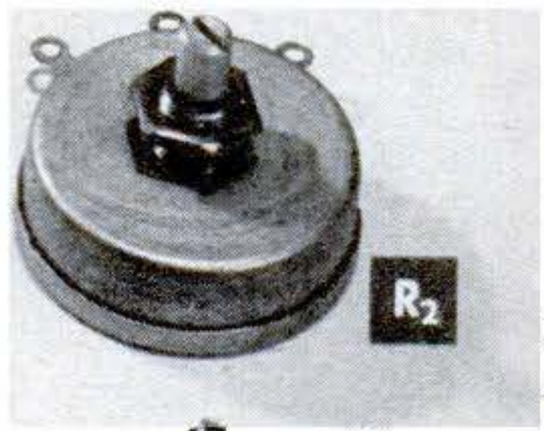
0—1-MILLIAMPERE METER

.02-MFD. 600-VOLT PAPER CONDENSER

5-POINT TIE STRIP

.015-MFD. 600-VOLT PAPER CONDENSER

50,000-OHM POTENTIOMETER

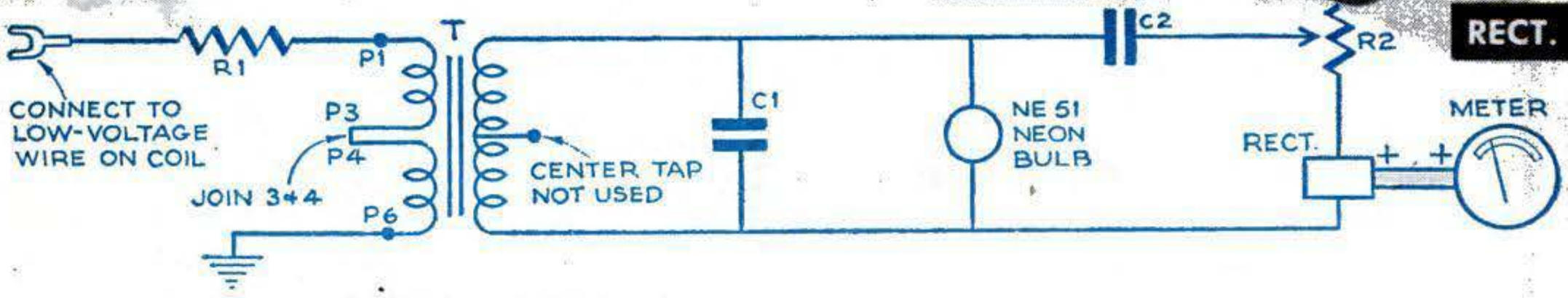


50-OHM RESISTOR, 1 WATT

NE-51 NEON BULB AND SOCKET

CONANT TYPE-M METER RECTIFIER

RECT.




meter and the calibrating resistor are attached to the transformer and wired up before being put in the case. The long lug strip is soldered right to the top of the transformer mounting strap, and the neon-bulb socket soldered to the side. Make the connections mechanically secure before soldering with rosin-core solder.

When you have the parts wired, connect the tach leads to ground (the engine or chassis) and to either end of the low-voltage wire that runs between the coil and distributor. Rev up the engine and note whether the neon bulb lights up at high speeds. It should light without flickering when the engine revs up fast. If not, cut down the value of R1 until it does. The lamp will flicker at idling speed, once each time a cylinder fires, but that is normal.

The neon lamp stabilizes the circuit, tends to compensate for variations in the ignition system, and holds readings steady despite changes in battery voltage. Do not try to calibrate your tach without making sure that the neon lamp glows steadily at top engine speeds.

***Scale.*** The values shown give speed readings up to 4,000 r.p.m. with an eight-cylinder engine. Actually, a range up to 4,500 or even 5,000 could be secured by re-adjustment of R2. But I figured that four quarter-scale divisions of 1,000 r.p.m. each would be most useful.

The common 0-1-ma. meter scale has five main divisions, on which it would be awkward to read a 4,000-r.p.m. range. I was able to substitute a scale from another meter having four main divisions, which works out fine. You can lick the same problem in several different ways:

- Calibrate the standard five-division scale to read 1,000 r.p.m. per division. (But un-



Copyrighted material

less you run a hot mill, this will crowd most readings over to the left.)

- Ink in a new scale on paper and cement it over the old one.
- Write to the meter manufacturer for a special scale—many makers supply them.

***Calibration.*** If you are mainly interested in relative r.p.m., calibration is a cinch. Just adjust R2 so that the meter reads 450 to 550 r.p.m. at a warmed-up idle and you're in business.

To get accurate calibration, the quickest way is to take the car to an ignition shop or garage having an electric tach as part of its engine analyzer. Take along a couple of extra .01- and .005-mfd. paper condensers in case you need to change the value of C2.

Have the garage tach connected and bring the engine speed up to about mid-range, say, 2,000 r.p.m. Set R2 so that your new tach corresponds. Then try it at 1,000 and 3,000 r.p.m. If the pointer goes beyond at both points, you should raise the capacity of C2 and readjust R2 to center the pointer again at the midscale speed. If on the other hand the pointer doesn't quite reach 1,000 and 3,000 after having been set right at 2,000, C2 must be reduced in capacity.

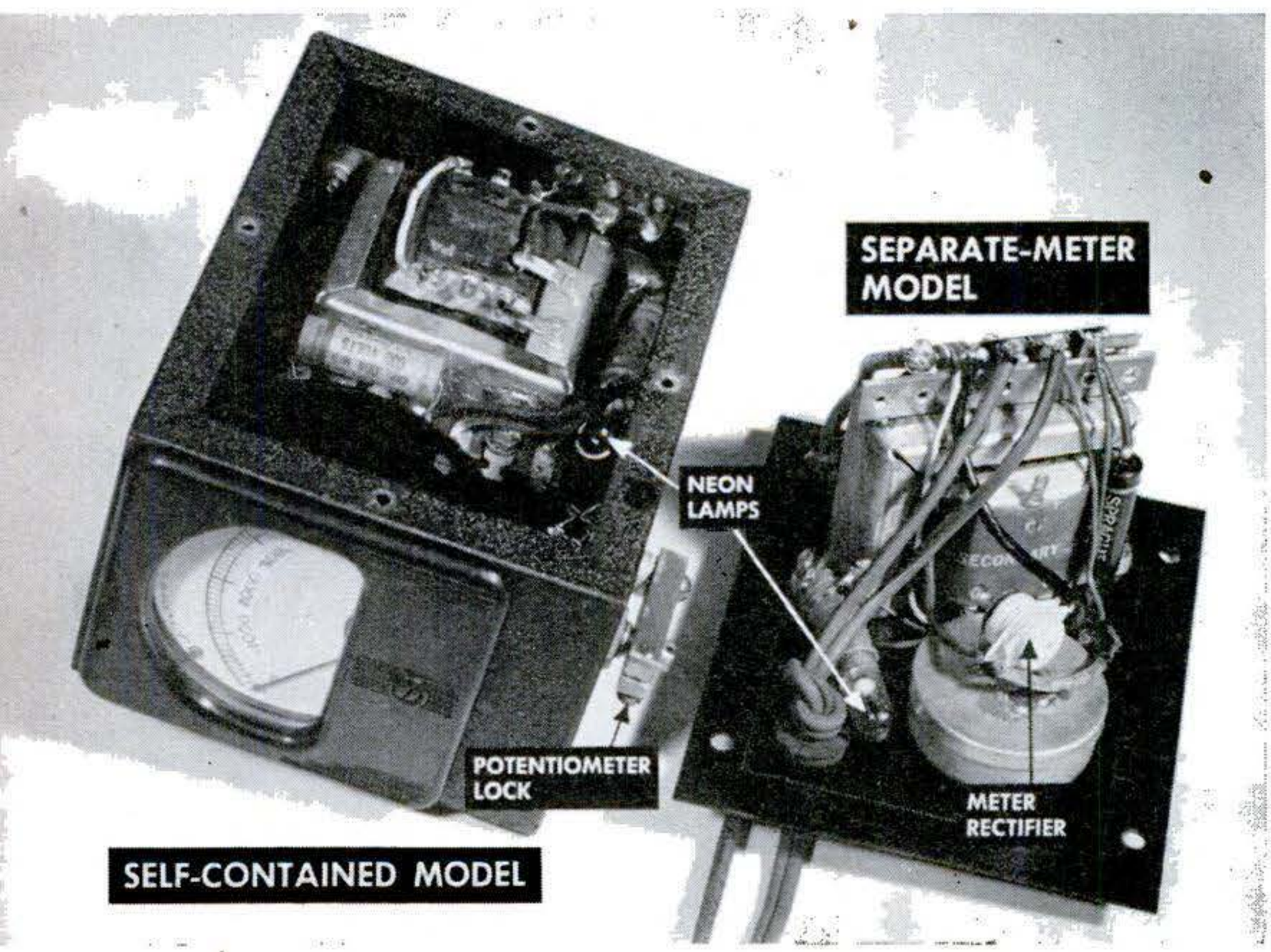
To increase C2, add .01 or .005 mfd. in parallel with the existing condenser. To reduce it, substitute a condenser having .005-mfd. less capacity.

***Road testing*** is another way to calibrate your tach. This may not work very well in cars with hydraulic couplings or torque converters, but can be employed on any standard-transmission car, including one with overdrive. (If you have overdrive, lock it out for the test.) You need to know the rear-end ratio, usually given in the owner's manual.

Measure the distance the rear wheels turn in one revolution, calculate how many revolutions they make in one mile, and multiply by the rear-axle ratio to get engine r.p.m. at 60 m.p.h. You can then reduce this to a table showing r.p.m. in high gear at 20, 30, 40 and so on. Don't forget that many speedometers read high in the upper ranges, so if possible check yours first over a measured mile.

***Fours and sixes.*** My tach was worked out for an eight-cylinder car. What about sixes and fours? A four has just half as many ignition pulses at a given speed as an eight, so a tach calibrated for an eight will read exactly half as high on a four. On a six, the readings would be reduced to 75 percent.

This means that if you want your tach to read 0 to 4,000 r.p.m. on a six-cylinder engine, you need a lower setting or lower total value on R2, and possibly an increased capacity for C2. For a six, use a .02-mfd. condenser and a 25,000-ohm pot; for a four, a .03-mfd. and 10,000 ohms. The values may not be on the nose for every car, but they will give you a start for calibration. END




**Two versions of tach** are shown here. One at far left is clamped to steering column by brackets on the side plate that is removed here. The other version is housed in metal box mounted in engine compartment, and wired to a meter set flush in dash. Nothing in tach is fragile or delicate, though meter should be protected from excessive vibration. Steel case is a standard radio part and costs 91 cents. It measures 3" by 4" by 5", makes convenient combined chassis-housing. Small card file would also do.



Copyrighted material

# Winter Driving Tips

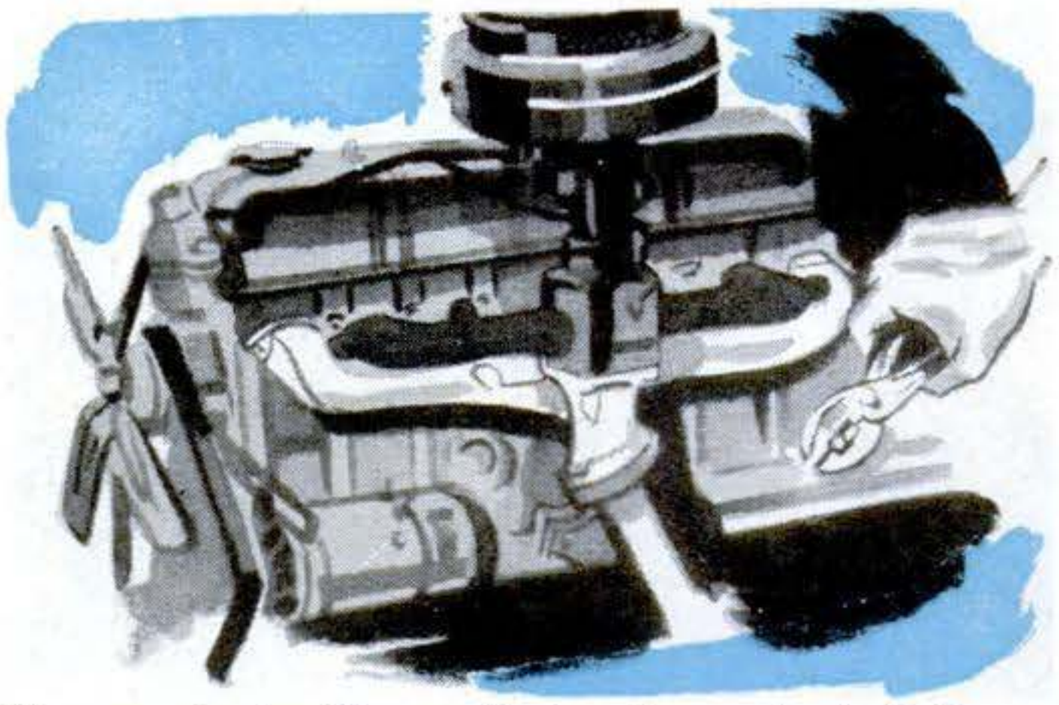
**Wet brake linings** caused by splashing water when you drive through a puddle can make your brakes ineffective or even useless. If you park and the water freezes, the parking brake may not release. Try to avoid slushy puddles; if you can't, drive a little with the brakes on to heat and dry the brakes. But don't drive too far this way.

**If the engine steams** but the radiator feels cold, stop at once and pour water into the radiator until you melt the ice that is blocking circulation. If you continue driving to melt the ice, you may cause serious damage to the overheated engine. Use melted snow in a pinch, but pour it in slowly and keep the engine running.

**Change oil** more frequently in winter than you do in summer. Cold starts rub tiny particles of metal off engine parts until the oil begins to flow. Carried by the oil, these particles act as abrasives all through the engine. Get rid of them by putting in fresh oil. Crankcase dilution is greater, too, another reason for frequent changes.

**Snow damages** a car more than rain because it splatters up underneath, rusting and corroding parts that rain cannot reach. Its action on chrome and paint also is more harmful than rain's. The remedy: frequent washing.

**Poorer gas mileage** can be expected because of higher friction losses, greater use of the choke and the longer warm-up time. You can't do much about *those* mileage robbers, but you can avoid show-off acceleration, excessive choking, pumping the accelerator pedal, stop-and-go driving and riding the clutch or brake.

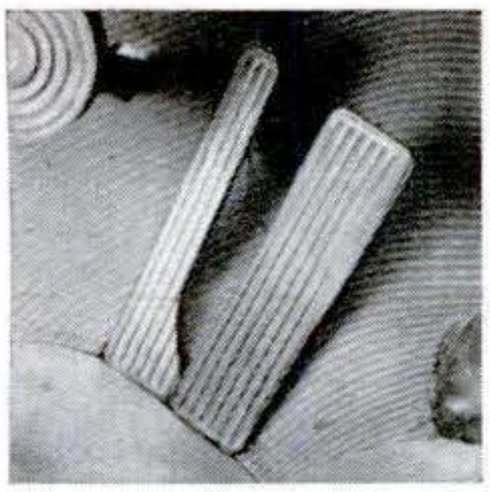


**If you drain the radiator** to protect it from overnight freezing, don't forget there's probably a drain cock on the cylinder block, too. Some people have forgotten—and paid for it.

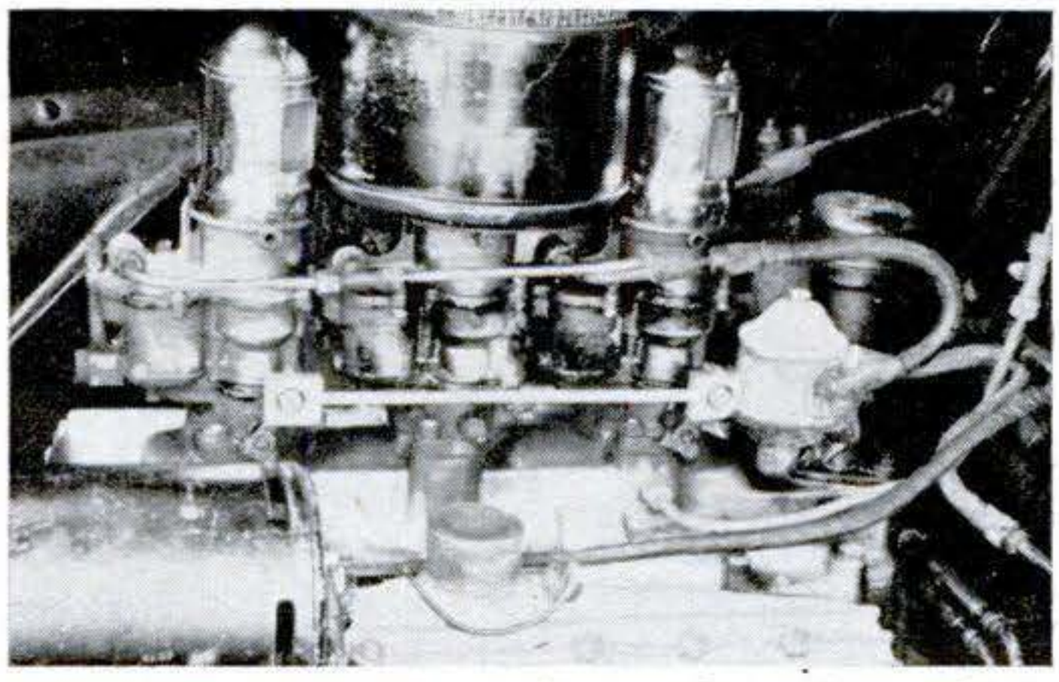
**There is no truth** to the statement you may sometimes hear that gasoline with a lower octane rating is more volatile and will give easier starting on a cold morning. Petroleum engineers say that the octane rating of a gasoline has no relation to its volatility.



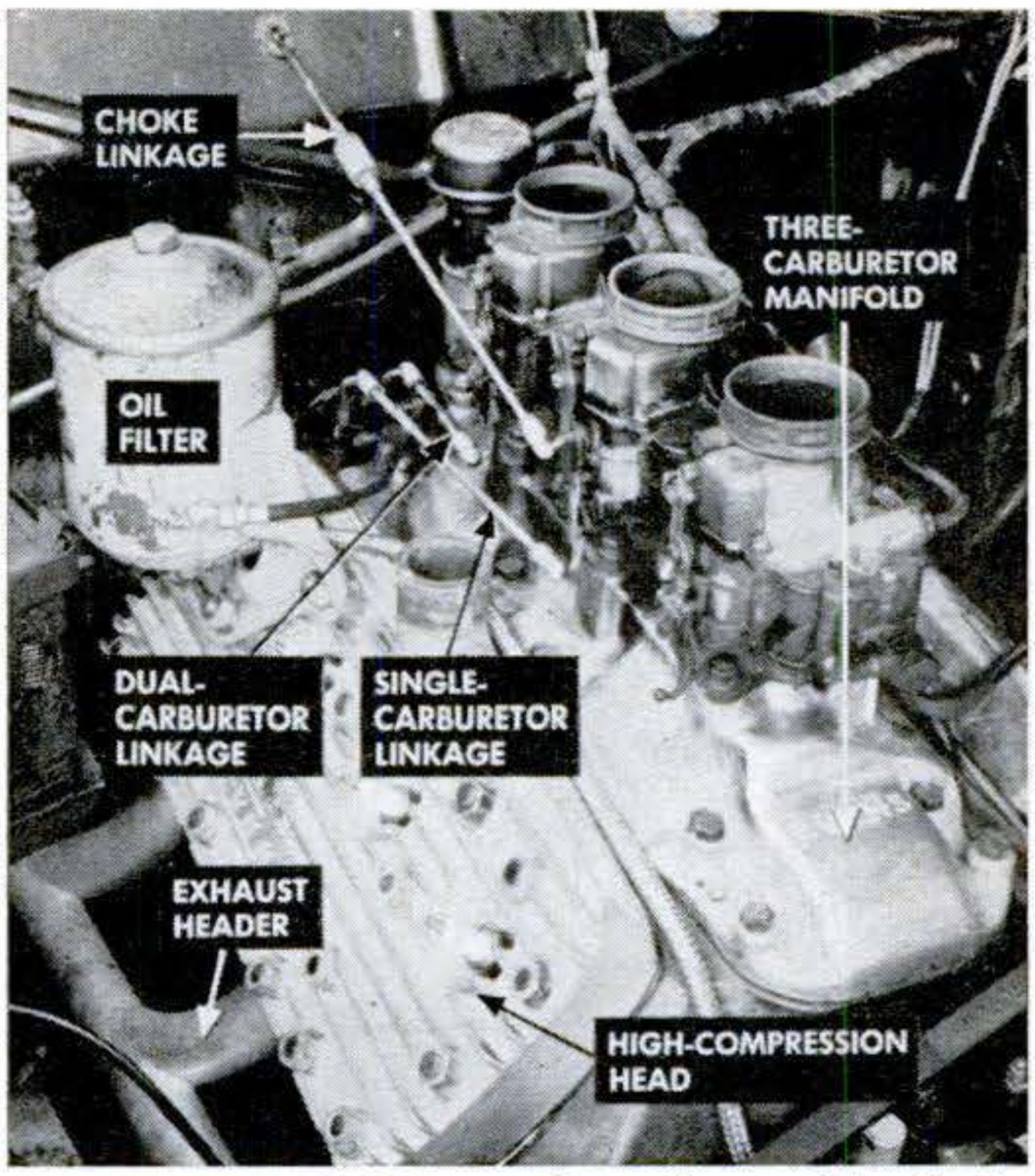
Copyrighted material



**TWO PEDALS** are close together so that a slight rotation of foot permits desired carburetion. Left pedal works the dual carbs.



**STRAIGHT LINKAGE,** underneath and paralleling the gas line, joins throttle valves of the end carburetors. Air cleaners that offer less restriction to air flow are used on these carbs.




**FULL DRESS** and three carbs to boot. The linkage from the dual-carburetor foot pedal connects to a linkage (on the other side of engine) that operates end carbs simultaneously.

## Two Accelerators Work Three Carburetors

I DRIVE my three-carburetor V-8 with two accelerator pedals. One controls a single carburetor for starting, moderate acceleration and cruising. The second cuts in the other two carburetors when I want a fast getaway or top speed.

My system thus combines the increased power output of multiple carburetors with the ease of adjustment, better economy, smooth idling and good low-speed performance of a single stock carburetor. In 25,000 miles of driving, I have not found any bugs.

Stock Ford carburetors were mounted on a three-carburetor intake manifold. Equalizing passages running lengthwise in this manifold split up the fuel-air charge.

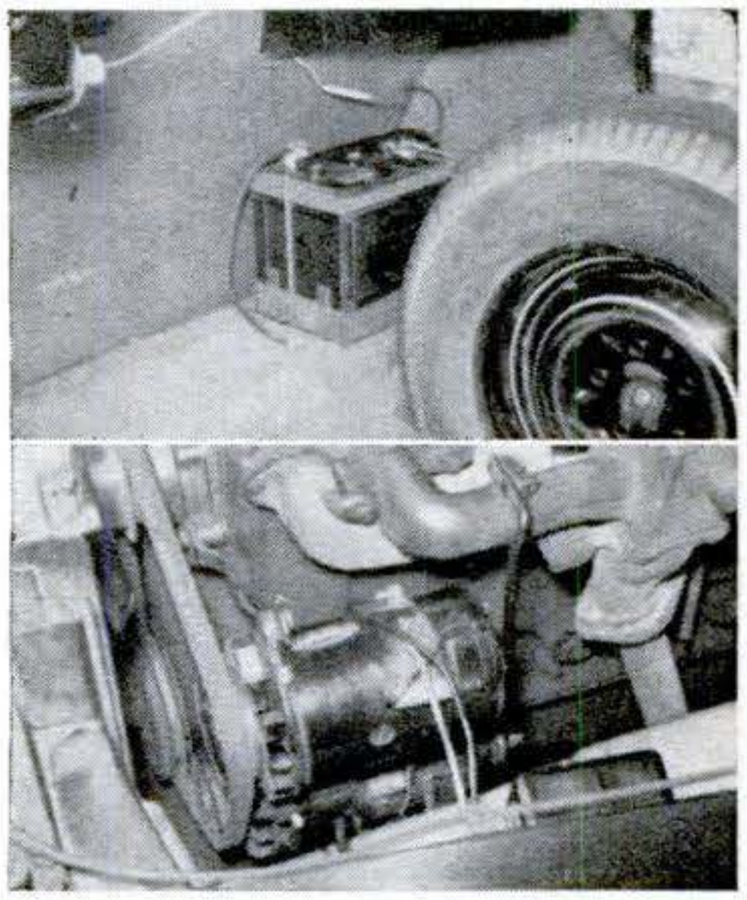
A simple coupling linkage was adjusted so that the throttle valves of the two end carburetors open and close together. On these carburetors, the idle-rate screws were backed out until the throttle valves close almost completely without actually wedging in the throats. Fuel to the idling jets was also blocked off so that, during idling, fuel and air are supplied to the engine only through the center carburetor. A choke valve and conventional air cleaner are used on this carburetor.—*R. L. Coffman, Arcadia, Calif.*

## Car Has Extra Generator and Battery

ELECTRICAL accessories on my car will never leave the battery so exhausted that it can't turn over the starter. They operate on their own separate electrical system consisting of a battery, generator, voltage regulator and ammeter.

A bracket holds the second generator above the first, and a longer fan belt drives both. The second battery is carried in the luggage compartment.

The radio, heater, turn lights and a trouble light operate off the second battery. When the ignition switch is on, a relay closes, completing the circuit to the heater and turn lights. This prevents them from being left on while the car is parked. The radio is connected directly to the battery.—*Ray McNair, Buffalo.*





Copyrighted material

# Gus Rescues

***Gus was nearly frozen working on that stranded station wagon, but the courage and faith of ten little kids warmed his heart.***

**By Martin Bunn**

BACK in town, Christmas Eve was filled with the old holiday magic. A feathery blanket of snow lay everywhere, and it was still coming down. Lights traced colored fantasies behind frosted, holly-decked windows. Here, the evening was warm with singing and children's dreams, touched with a quiet merriment as eternal as the light from that one Star seen a long time ago. But out on the open highway, an icy wind pushed against Gus Wilson's car with a force that gave the evening anything but a holiday flavor.

It wouldn't last long, though. Once he



Copyrighted material

# Ten Little Angels

*The small voices rose above the wind. "Silent Night, Holy Night . . ."*

reached the home of Charlie Rheingold and his wife, where he had been invited to spend the holidays, the storm would no longer matter. Gus would let it cry in the eaves, while he enjoyed an open fire and waited for Christmas Day.

### *Gus Takes a Short Cut to Trouble*

He snuggled into the new, 60-buck overcoat, a Christmas present to himself, and listened to the monotonous tick-squee of the windshield wipers. It was cold in the car, and he wished that there had been time to fix the heater before closing down the Model Garage for the holidays.

An intersection loomed vaguely in the wash of his lights, and Gus slowed to make the turn. The smaller side road was a shorter route to Eastville, the next town. It was just a bit beyond Eastville that the Rheingolds lived.

Gus passed an occasional bright-windowed farm house standing well back from the road. Then, gradually, the farm area



Copyrighted material

thinned away and the country became lonely, dark and remote in the storm. If he had been going any faster, Gus might not have seen the station wagon at the side of the road, with a half-frozen figure bent under the hood.

### *Station Wagon Is Stranded*

Gus eased to a stop, backed up and asked if he could help.

"Mister," the man said numbly, "you sure could!"

"It's a bad night. Gus Wilson's the name. I'm a mechanic."

"I'm mighty glad to meet you, believe me. I'm Perry Wingate—lawyer from upstate. I was driving these kids to Eastville to sing in the church service tonight. The engine died on me all of a sudden."

Gus peered in through the windows and saw 10 small, solemn-faced children huddled close together on the seats.

"And this is Lydia Randolph, my fiancée. This is her Sunday school class." Gus nodded and the pretty young woman in the front seat smiled back cheerfully.

"The heater isn't working, of course, with the motor dead," Wingate went on. "I've got to get these kids out of here before they all get pneumonia. And they're going to be heartbroken if they don't get to the church in time to sing." He nodded hopelessly at the '39 Plymouth station wagon. "She acted just as if she'd run out of gas, even though there's plenty in the tank." Wingate looked a bit sheepish. "I haven't even got a tow-rope."

"Neither have I. Let me have your flashlight, and get inside while I look."

"Don't you need help?"

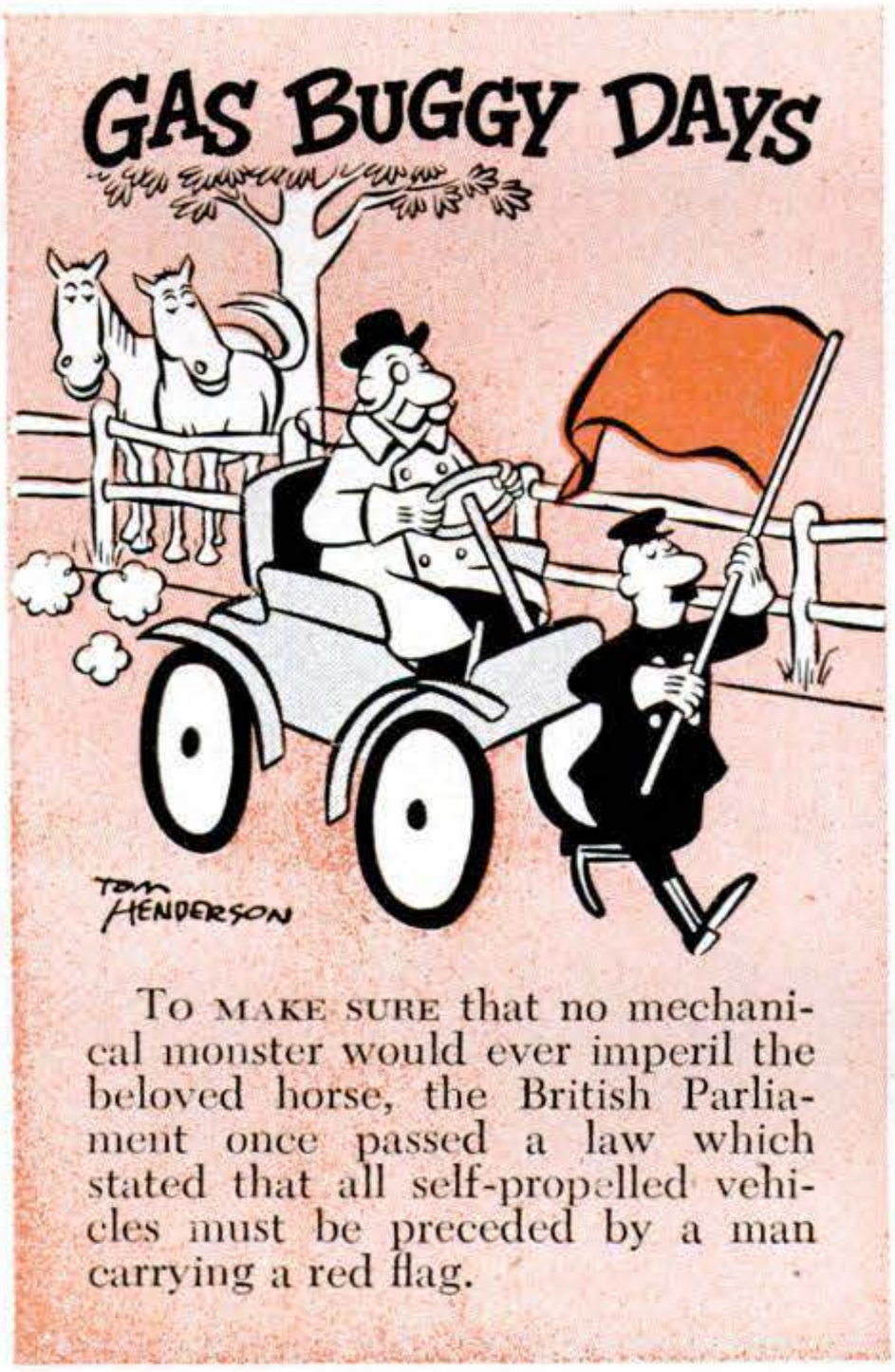
"I'll let you know."

"Okay, then. . . Say, would you mind if we crammed the kids in your car, with your heater?"

"I wouldn't mind at all, except mine's on the blink. Haven't had time to fix it."

"That's rough. Well, I hope you have some quick luck."

Gus studied the situation. The nearest farm was some distance back. It would take two or three trips, and a lot of precious time to drive the kids back in his coupe—time that would completely erase the Christmas Eve plans the kids were counting on. He couldn't tow the station wagon, and the icy surface of the road made it too dangerous to try to push it. There was always the possibility that a car might come along soon, a car with a rope, but they couldn't take the chance of depending on it. Even if he removed his tire chains and used them to try to pull the other car, the wheels on his old coupe would just slip and slither on the hilly road. There was just no other way but to find the trouble.



To MAKE SURE that no mechanical monster would ever imperil the beloved horse, the British Parliament once passed a law which stated that all self-propelled vehicles must be preceded by a man carrying a red flag.

Gus shrugged out of his new coat and made a rapid check of the distributor connections, the coil line, rotor and points. It took only a few minutes, but when he finished he was already shuddering with the cold that seemed to creep into his bones. He looked for bare wires, loose wires, anything that might cause a short, but there was nothing. Then he went around to the other side to check the carburetor. . .

### *Gus Gets Some Unexpected Help*

At first, it sounded like ghost voices in the storm. The children were sitting straight in their seats, their small voices rising above the wind. *Silent night, Holy night* . . . It was one way of saying thanks, one way of cheering him up and giving him a little moral support when he needed it badly. . . *All is calm, All is bright*. . . Gus smiled back at them. Now some of the bite seemed to have gone out of the wind.

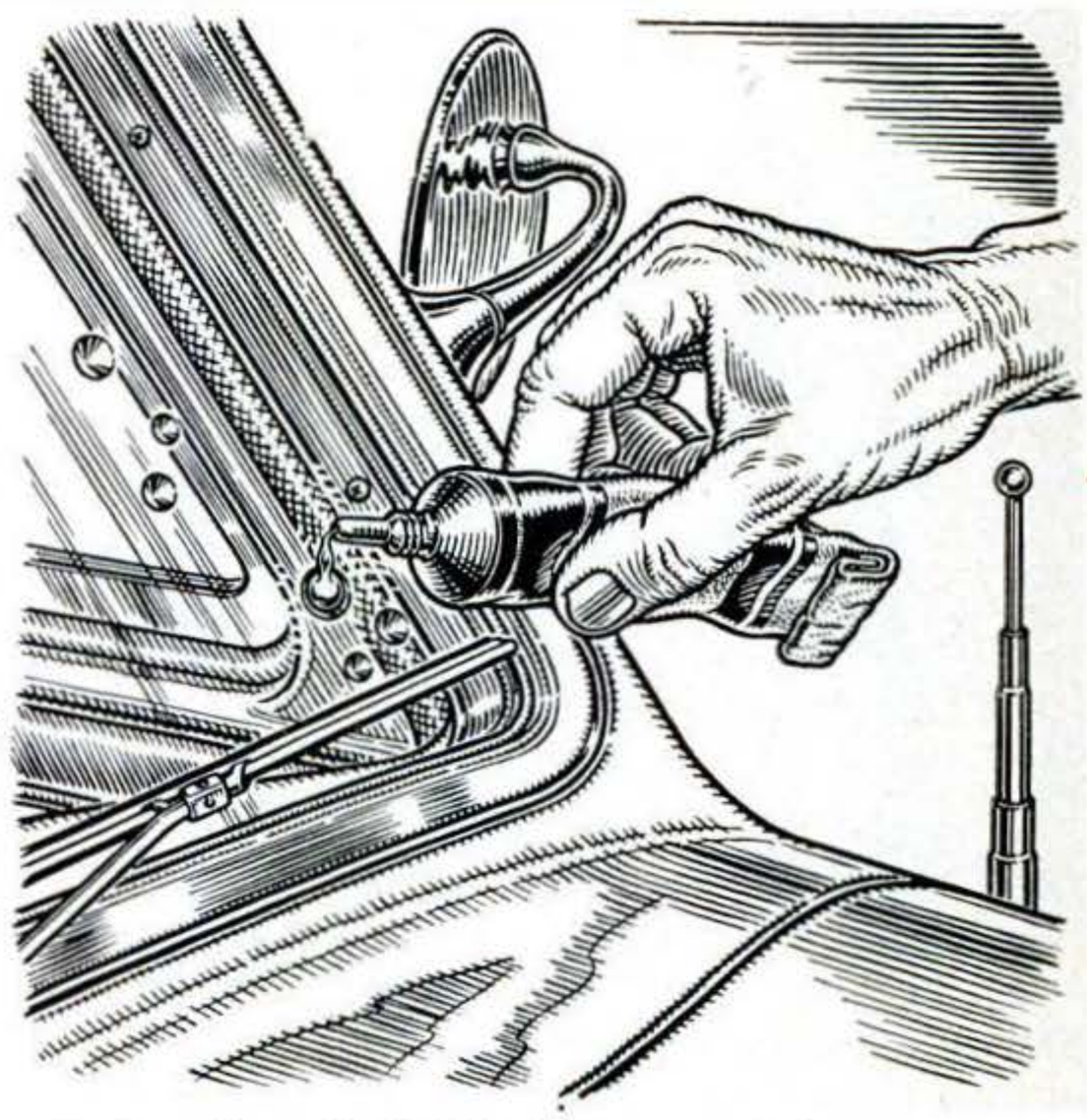
[Continued on page 232]



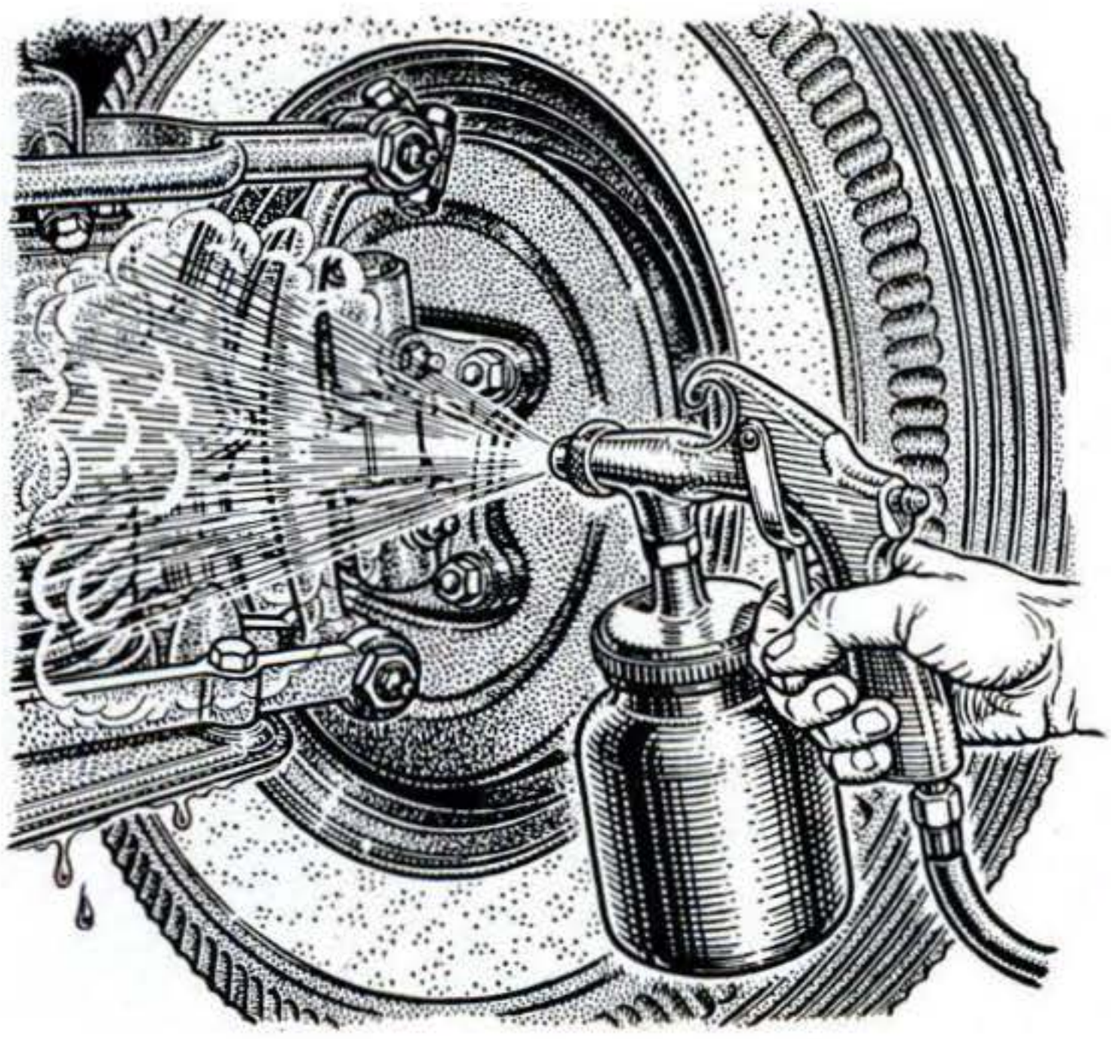
Copyrighted material

# Hints from the Model Garage

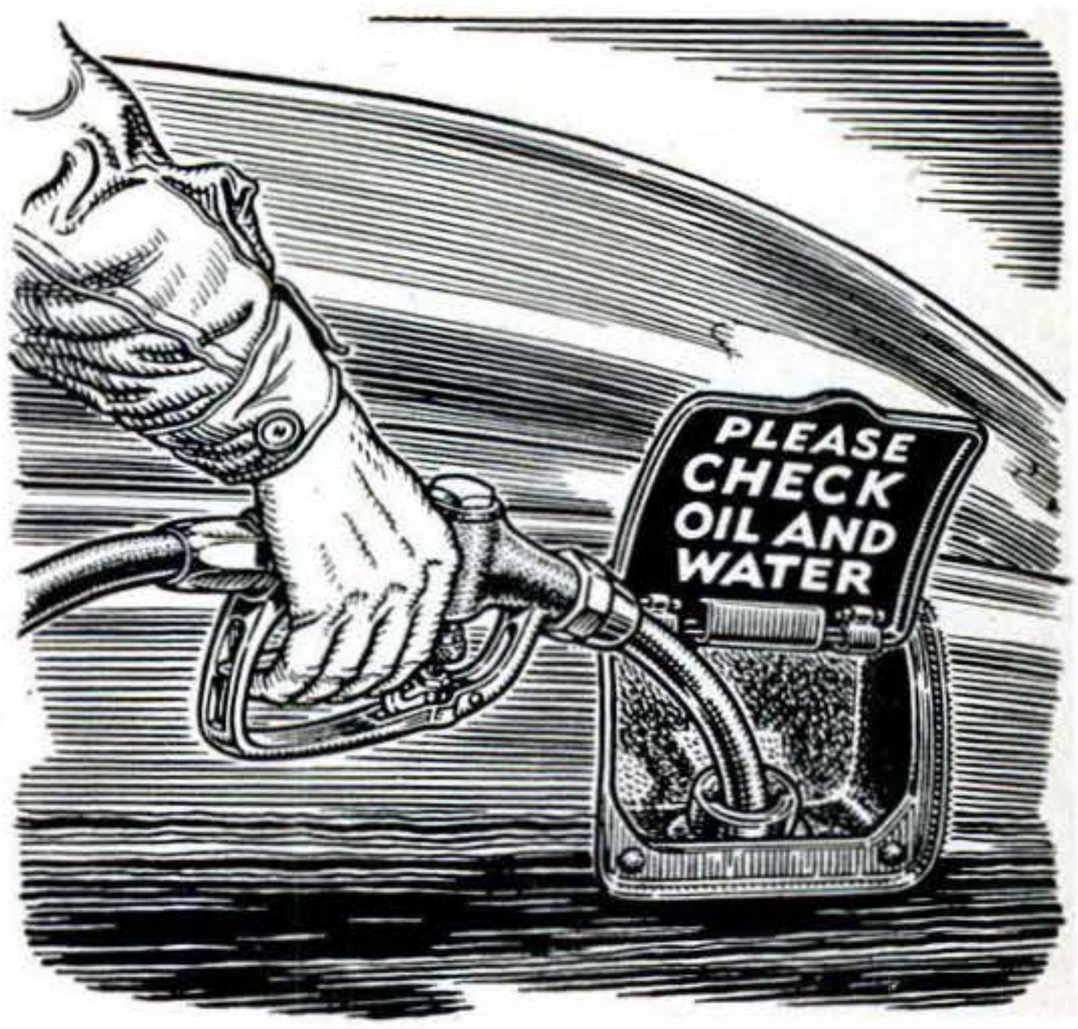
**After wax has been applied** to a car and is ready to be rubbed down, you'll get a rave job if you dip the wiping cloth lightly in a pan of flour. The surface will brighten up with far less work with the polishing cloth.



**Holes in windshields** caused by stones or BBs are often conical ones with the small end on the outer side. To keep moisture from discoloring the safety glass, wash the hole with household ammonia, let it dry and apply transparent cement to both sides.



**Grease can be cleaned off** such parts as the front suspension, transmission or differential by using a paint sprayer to spray on kerosene. Allow the kerosene to soak in for a few minutes and then turn a water hose on the area full force.




**When his car began to burn oil,** one owner lettered this legend on the underside of the filler-cap door. His car is driven by several persons, and the sign lessens the chance that someone will neglect to have the oil checked at each gas stop.

***Please turn the page for more auto hints.***

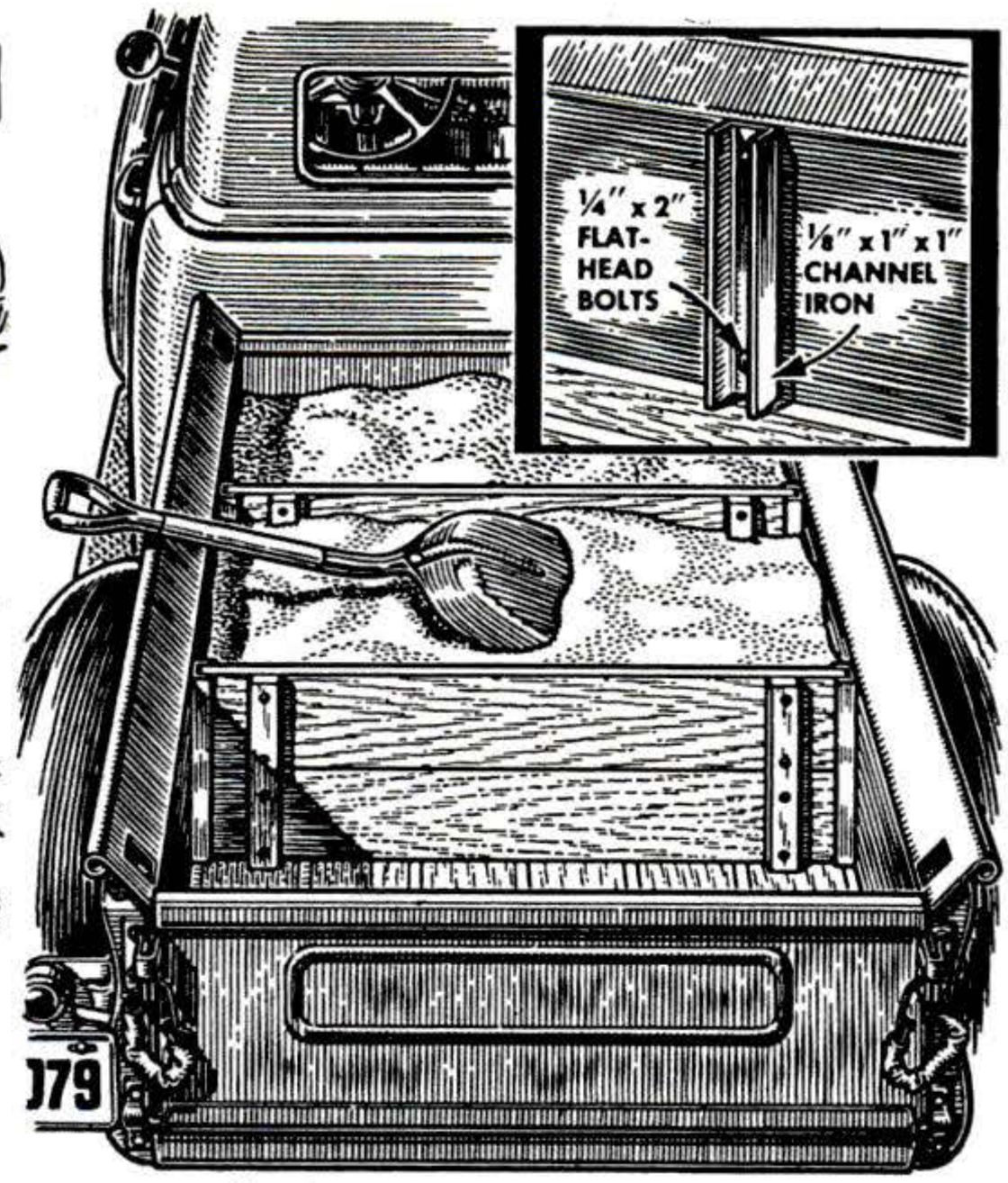


Copyrighted material

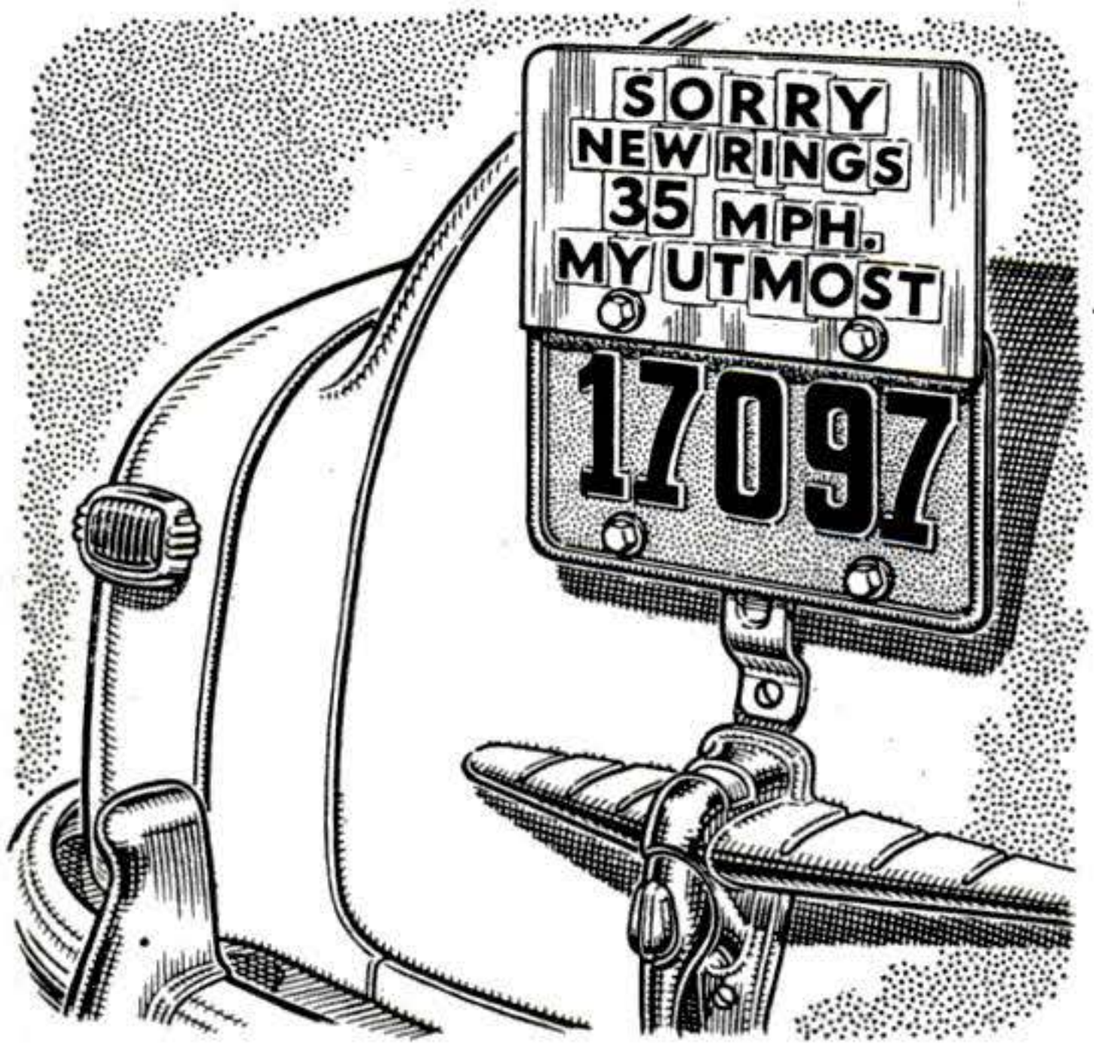
## *MORE* Hints from the Model Garage

**Wash mud and salt off** your chains after each use and hang them up to dry. This will make them last longer. Even with proper drying the steel may rust some, but light rusting will not affect chain strength.

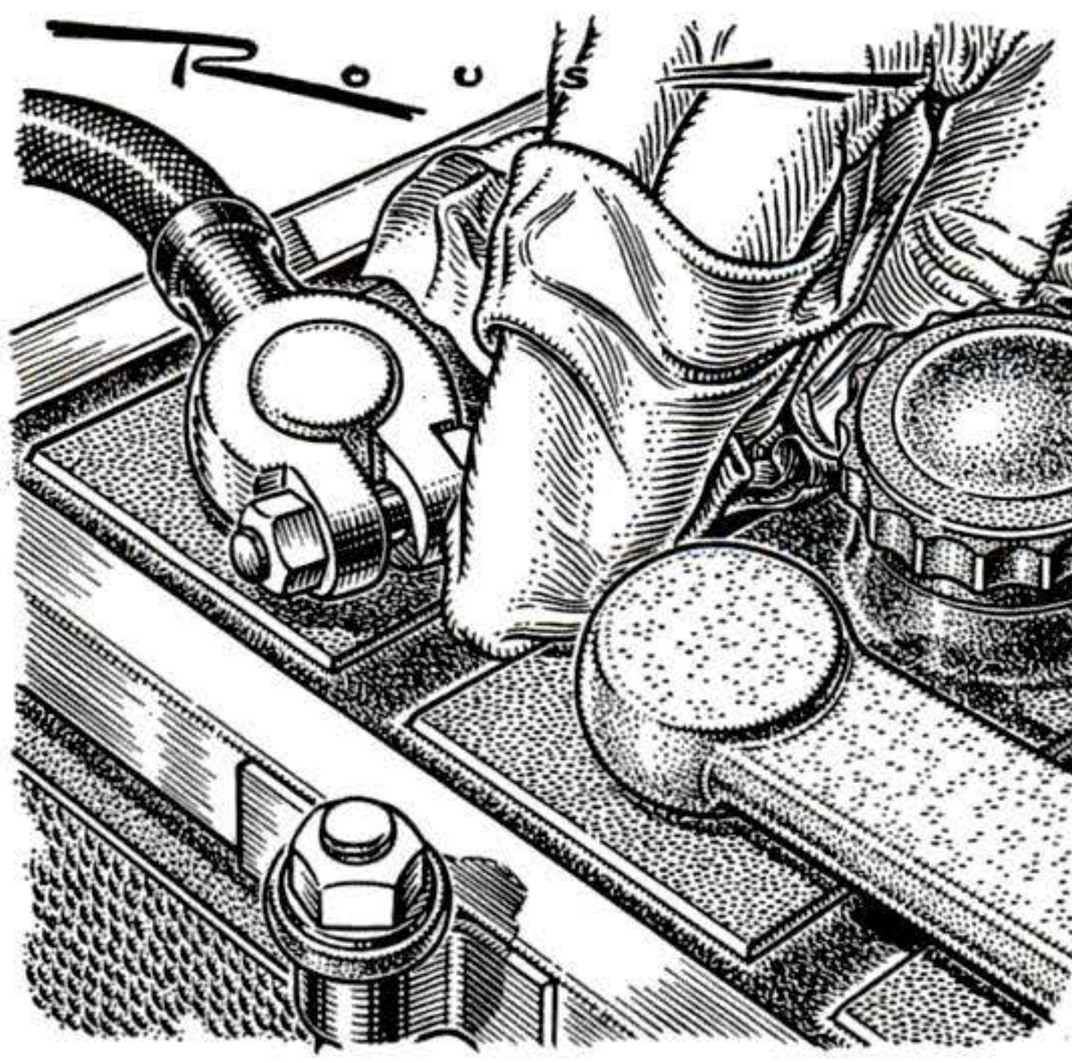
When one cross chain breaks, it is advisable to replace them all. If one has broken, others will probably soon go.




**Sand and gravel** or other different materials can be carried in a small truck at the same time without mixing if you divide the body like this. Install matching pieces of channel iron on opposite sides of the body. Cut division boards to slip into the channels. It may help to space each division to hold one cubic yard of material.




**To avoid toots and angry glances** after a ring job, one car owner bolted this sign to the rear of his car. He made the sign by cutting letters from a newspaper and cementing them to a piece of tin about the size of his license plate.



**Wipe off dirt and moisture** from the top of your battery occasionally. If too much piles up, it will form a leakage path between the terminals. Another tip: clean out the small vent holes in the plugs with fine wire from time to time.



Copyrighted material

# HOT-ROD DICTIONARY

THE POPULAR SCIENCE MONTHLY HOT-ROD DICTIONARY is an entirely new work. It will, however, have for many persons the characteristics of an old friend; for it was compiled by William Callahan, editor of Motorsport Magazine and an authority on the lingo of track, shop, back-yard and armchair soupers.

No claim is made that the DICTIONARY embraces the full scope of the colorful jargon that hot-rodders use. No such work as this *ever* could be complete. Like a lusty infant, hot-rod language is growing all the time. New words and phrases are coined every day. Yesterday's often become obsolete today and we must caution the reader that some of these may have snuk into the present work.

Because strange words offer pronunciation problems, we have tried to show how those in the know say them. The key at the bottom of the page is based on Webster's New International, to which and to whom we make our bows and apologies.

## A

**al'ky** (ăl'kē), *n.* Methanol, a volatile and inflammable liquid commonly known as wood alcohol. It is sometimes used as motor fuel in place of gasoline, esp. in racing events.

## B

**bald'y** (bôl'dĭ), *n.;* pl. -ies. A tire from which the traction-producing treads have worn away, leaving the carcass as smooth as a hairless man's head.

**bar'rel** (băr'ĕl), *n.* A cylinder, or hole in the engine block where a piston moves up and down or back and forth.—Syn. See BORE, HOLE.

**beast** (bēst), *n.* Car with outstanding acceleration characteristics. One that gets away while the others are just thinking about it, or stirs up the dust first and fastest.—Syn. See BOMB.

**bed** (bĕd), *n.* Frame, or metal substructure, of an automobile on which the body, engine and passengers ride.

**bel'ly tank** (bĕl'ĭ tăngk), *n.* A car with the body built from a cigar-shaped World War II airplane drop tank. Only the axles and wheels extend beyond the tank.

**bent eight** (bĕnt āt), *n.* Any V-8 engine. Its cylinders are arranged in two lines of four, the lines being set at an angle to each other like the sides of a letter V.

**bind'er** (bīn'dĕr), *n.* The brake of a car, usually occurring in sets of four; as, he had his *binders* relined.

**blow'er** (blō'ĕr), *n.* A supercharger or compressor that increases the air pressure at the carburetor intake above normal atmospheric pressure. Ramming more air into the combustion chambers increases volumetric efficiency of the engine.

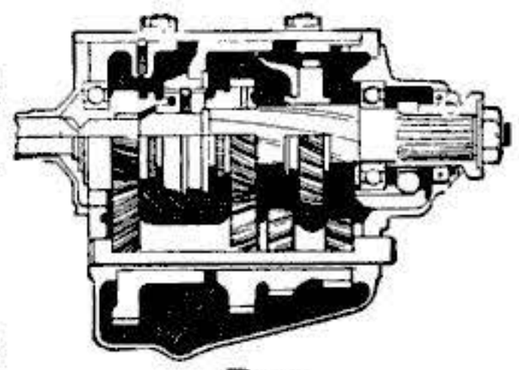
**bomb** (bŏm), *n.* A car that starts as fast and gets there as quickly as a projectile.—Syn. See BEAST.

**bone** (bōn), *n.* A Model A Ford.

**boot** (bo͝ot), *n.* A tire, so-called perhaps because both it and a man's wet-weather foot covering are made of rubber.—Syn. See GUMMY, SHOE, SKIN.

**bore** (bōr), *n.* An engine cylinder, not a dull person. — Syn. See BARREL, HOLE.

**bore** (bōr), *v.* To increase the capacity of a cylinder by enlarging its inside diameter.



Box

**box** (bŏks), *n.;* pl. boxes (bŏk'sĕz). A transmission or set of gears for transmitting engine driving force to the wheels in varying ratios.

## C

**cal'i·ber** (kăl'ĭ·bĕr), *n.* A word sometimes used to describe the size of a cylinder.

**cam** (kăm), *n.* Short for camshaft, the rod with rotating projections that give timed movements to the exhaust and intake valves. —Syn. See STICK.

**chan'nel** (chăn'ĕl), *v.t.* To modify the body so that it can be dropped down and around and below the frame.

**chan'neled** (-ĕld), *adj.* A word describing

āle, châotic, câre, ădd, ärm, ask; ch, chair; ēve, hēre, ēvent, ĕnd, makēr; g, go; īce, ĭll; k, keep; ng, sing; ōld, ôbey, ôrb, ŏdd, sŏft; oi, oil; fo͝od; fo͝ot; ou, out; sh, she; th, thin; cūbe, ûnite, ûrn, ŭp; zh, z in azure.



Copyrighted material

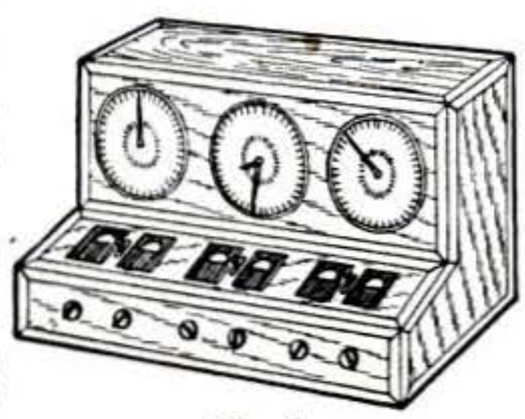
a hot rod on which the act of channeling has been performed. Hudson's Step Down is a channeled design.

**cher'ry** (chĕr'ĭ), *n.;* pl. -ies (-ĭz). A stock car in perfect condition.

**chop** (chŏp), *v.t.* To lower the over-all height of a car by removing sections of metal from the roof supports or side of the body and rejoining and welding the remaining parts together. Usually when this work is limited to the top or roof it is called chopping. If the body panels, doors and fenders are reduced in height it is called sectioning.

**chopped** (chŏpt), *adj.* Descriptive of a hot rod on which the act of chopping has been performed.

**chopped fly'wheel** (chŏpt flī'hwēl), *n.* An engine flywheel from which metal has been ground away to reduce the weight. The light flywheel has less inertia and aids acceleration.



Clock

**clock** (klŏk), *n.* An electrical device used to time cars in races.

**col'umn shift** (kŏl'ŭm shĭft), *n.* A lever for shifting gears, mounted on the steering column.

**con rod** (kŏn rod), *n.* Short for connecting rod. This rod connects the piston to the crankshaft and transmits the force from the piston to the crankpins in the crank throws, thus transforming reciprocal motion into rotary motion.

**crank** (krăngk), *n.* The crankshaft. Sometimes also called shaft.

**crash box** (krăsh bŏks), *n.* A transmission with straight cut or spur gears.

## D

**da'go** (dā'gō), *n.* A front axle which has been stretched and the center section lowered in relation to the wheel spindles to lower the front end of the car.—Syn. DROPPED AXLE.

**de·chrome'** (dē·krōm'), *v.t.* To remove the chrome trimming from a car and fill in the holes with lead.

**deck** (dĕk), *v.t.* To remove chrome trim from rear trunk lid and rear of car.

**de·stroke'** (dē·strōk'), *v.t.* To reduce the length of the piston stroke of an engine.

**dog clutch** (dŏg klŭch), *n.* A positive clutch that is either fully engaged or completely disengaged. It cannot be slipped. It is used only in racing.

**drag** (drăg), *n.* An acceleration contest, usually between two cars but frequently run against a clock. Also sometimes called a drag race.

**drag'gin' wag'on** (drăg'ĭn wăg'ŭn), *n.* A car especially set up for drags.

**dropped ax'le** (drŏpt ăk's'l), *n.* See DAGO.

**du'al set'up** (dū'ăl sĕt'ŭp), *n.* An intake manifold especially designed for two carburetors. Some manifolds accommodate four or five carbs.

**du·ra'tion** (dū·rā'shŭn), *n.* Period of valve opening, usually expressed in degrees of crankshaft or flywheel rotation.

## F

**flat crank** (flăt krăngk), *n.* A crankshaft on which the throws are all in the same plane on opposite sides of the centerline of the main bearings. Also known as a 180° crank. In contrast, most V-8 crankshafts are designed with the throws arranged at angles of about 90°.

**four bang'er** (fōr băng'ĕr), *n.* A four-cylinder engine.

**four-wheel drive** (fōr-hwēl drīv), *n.* A car in which power is applied through all four wheels.

**french'ing** (frĕnch'ĭng), *n.* A form of molding by which headlamp rims are smoothed into the fender line. The rims are usually eliminated.

**front-wheel drive** (frŭnt-hwēl drīv), *n.* A car in which the driving power is applied through the front, rather than the rear, wheels.

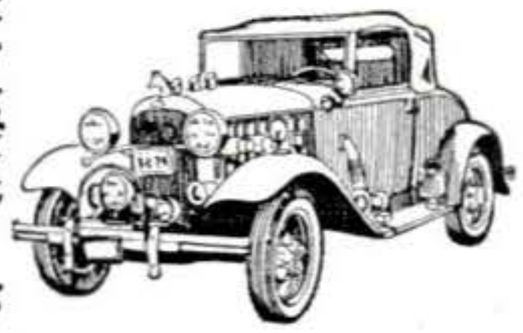
**fu'el block** (fū'ĕl blŏk), *n.* A device with multiple outlets interposed between the fuel pump and the carburetors to insure equal fuel pressure at each carburetor.

**full house** (fŏŏl hous), *n.* An engine that has been given the complete hot-rod treatment. It has everything the owner could buy or do to improve its efficiency and looks.—Syn. See LOADED.

## G

**goat** (gōt), *n.* Just any old racing car, seldom the speaker's.

**gook wag'on** (gŏŏk wăg'ŭn), *n.* A car which has everything outside in the way of fancy ornaments, but nothing inside.



Gook Wagon

**gum'my** (gŭm'ĭ), *n.;* pl. -ies. A tire.—Syn. See BOOT, SHOE, SKIN.

## H

**head'er** (hĕd'ĕr), *n.* A series of special tubes installed in place of the conventional exhaust manifold to lead exhaust gases smoothly away from the cylinders and reduce back pressure.

**herd** (hûrd), *v.* To drive a car.

**high head** (hī hĕd), *n.* An engine cylinder head designed to increase compression of the fuel-air charge. A high-compression cylinder head.

**high-lift cam** (hī-lĭft kăm), *n.* A camshaft on which the lobes are designed and ground to increase the valve lift and change the



Copyrighted material

valve overlap. Special grinds include: road, semi-race, three-quarter-race and full-race cams.

**high-lift rock'er** (hī-lĭft rŏk'ẽr), *n.* A rocker arm designed to increase the valve lift on an overhead-valve engine without installing a special high-lift cam.

**hole** (hōl), *n.* A cylinder.—Syn. See BARREL, BORE.

**hot cam** (hŏt kăm), *n.* A high-lift camshaft, usually of more extreme design than a road cam, the grind nearest to a passenger-car stock cam.

**hot mill** (hŏt mĭl), *n.* A souped-up engine, or any engine with a lot of zip.

## I

**in'sert** (ĭn'sûrt), *n.* A steel-backed, babbitt-lined bearing which can be replaced in a connecting rod or main bearing.

## J

**jigg'ler** (jĭg'lẽr), *n.* One of the rocker arms that actuate the valves in an overhead-valve engine.

**jug** (jŭg), *n.* A carburetor.—Syn. See POT.

**juic'es** (jōōs'ĕz), *n.* Hydraulic brakes. Ordinarily used in the plural only.

**junk'y** (jŭngk'ĭ), *n.* A hot rod belonging to someone else.

## L

**lake'ster** (lāk'stẽr), *n.* A competition hot rod with a special body and no fenders. A belly tank is an example of a lakester.

**lift** (lĭft), *n.* The distance the cam lobe lifts the valve.

**load'ed** (lōd'ĕd), *adj.* Applied to an engine that has been burdened with all possible hot-rod accessories.

**locked rear end** (lŏkt rẽr ĕnd), *n.* A rear axle in which the differential gears have been welded to eliminate the differential action normally used to compensate for the wider circle the outside wheel must travel in cornering.

**low'er·ing block** (lō'ẽr·ĭng blŏk), *n.* A metal block inserted between the axle and the spring seat to lower the body.

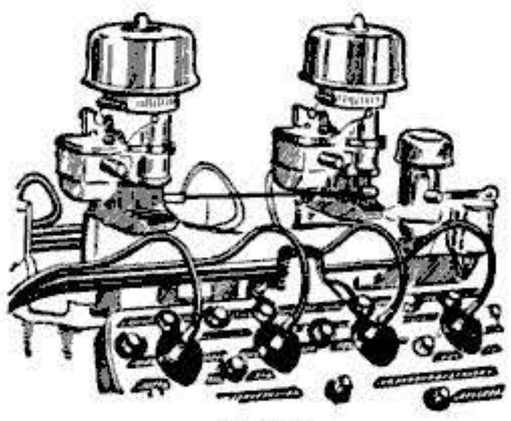
**low'er·ing shack'le** (lō'ẽr·ĭng shăk''l), *n.* Extra-long spring shackle designed to lower the over-all height of a car.

## M

**mag** (măg), *n.* Short for magneto. In racing a mag is frequently used in place of battery ignition.

**mill** (mĭl), *n.* An engine.

**milled head** (mĭld hĕd), *n.* A stock cylinder head from which a thin slice of metal has been shaved or milled (in a milling machine). The metal is removed from the entire lower surface of the head. Since this reduces the size of the compression chamber, compression is increased—the object of the procedure.


Mill

**mold** (mōld), *v.t.* To fill in sharp corners where pieces of body metal meet so as to obtain a smooth curve.

## N

**nerf** (nûrf), *v.t.* To push another car around.

**nerf'ing bar** (nûrf'ĭng bär), *n.* A bar, usually of ornamental tubing, installed in place of the bumper. It is used for nerfing.

**nest'ed valve springs** (nĕst'ed vălv sprĭngz), *n.* pl. Double valve springs, with the smaller one operating within the larger one. The object is to overcome valve flutter at high speeds.

**ni'tro** (nī'trō), *n.* Short for nitromethane, a high-powered motor fuel.

## O

**ohc** (ō·āch·sē), *n.* Short for overhead camshaft, or an engine with valves operated by an ohc.

**ohv** (ō·āch·vē), *n.* Short for overhead valves, or an engine in which the valves are located in the top of the combustion chamber.

**o'ver-bor'ing** (ō'vẽr-bōr'ĭng), *v.t.* Sometimes used in place of boring, i.e., enlarging the inside diameter of a cylinder to increase its capacity.

**o'ver·lap** (ō'vẽr·lăp), *n.* The period when the intake and exhaust valves of a cylinder are both open.

## P

**pis'ton boss** (pĭs'tŭn bŏs), *n.* One of the pair of internal knoblike protuberances in a piston into which the piston pin is fitted.

**port** (pōrt), *n.* The passageway which leads through the block (or head in the case of an overhead-valve engine) to carry the fuel-air charge from the carburetor to the cylinder, or to carry out exhaust gases.

**port** (pōrt), *v.* porting. To enlarge and polish the interior of a port to provide a free flow of the fuel-air mixture.

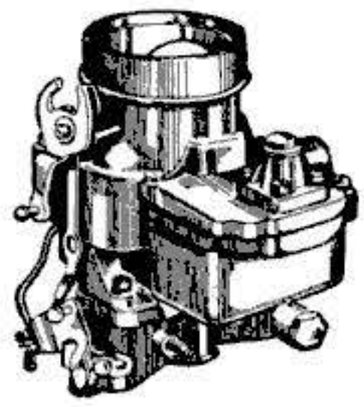
**port'ed job** (pōrt'ed jŏb), *n.* An engine in which the ports have been enlarged and polished.

**pot** (pŏt), *n.* A carburetor.—Syn. See JUG.

**pot out** (pŏt out), *v.i.* To have engine failure because of carburetor trouble.

**pres'sure** (prĕsh'ẽr), *n.* Sometimes used as a synonym for horsepower.

**prune** (prōōn), *v.t.* To defeat, as in a race.


Pot

**push rod** (pŏŏsh rŏd), *n.* A rod extending inside the engine from the camshaft to the rocker arm to transmit the lifting effect of the cam lobe.



Copyrighted material

## Q

**quick-change rear end** (kwĭk-chānj rēr ĕnd), *n*. An axle housing with a removable cover to facilitate gear-ratio changes.

## R

**rail** (rāl), *n*. A side member of the car frame.

**re·lieve′** (rē·lēv′), *v.t*. To grind away the metal ridges left between the valve openings and cylinder bores in a production flathead engine. About ⅛″ of metal is removed, usually with a hand grinder. This lessens resistance to the flow of the fuel-air mixture from the intake valves to the combustion chambers, improving efficiency of the engine. But relieving also has a drawback. Since the combustion chamber is made larger, the compression is reduced. Relieving usually is not done unless the engine also is bored and stroked.

**re·lieved′ block** (rē·lēvd′ blŏk), *n*. An engine block that has been relieved.

**roll bar** (rōl bär), *n*. A heavy metal bar attached to the frame and extending over the driver's head to protect him from being crushed if the car rolls over.

## S

**sec′tion** (sĕk′shŭn), *v.t*. See CHOP.

**shoe** (shōō), *n*. The rubber on which a car travels—one of its tires.

**skin** (skĭn), *n*. Same as shoe.

**sleeve** (slēv), *v.t*. To reduce the capacity of an engine's cylinders so that the car can be entered in a lower racing classification. The cylinders are bored and sleeves of smaller inner diameter are installed.

**sleeved en′gine** (slēvd ĕn′jĭn), *n*. An engine with sleeves in its cylinders.

**slick** (slĭk), *n*. A wide, smooth tire used in racing.

**slug** (slŭg), *n*. A piston.

**soup** (sōōp), *v.t*. To rework an engine to give it more horsepower, sometimes only by adding power-boosting accessories. Usually expressed as "soup up."

**stack** (stăk), *n*. A short pipe used to direct exhaust gases away from an individual cylinder. Short pipes used on carburetor intakes also are frequently called stacks.

**stick** (stĭk), *n*. A camshaft.

**stick a foot in the pot.** To open the throttle wide. The phrase might be used this way: "He stuck his foot in the pot and herded his goat to the head of the pack. He'd 'a pruned the field if he hadn't potted-out in the turn." This means: "He opened the throttle wide and drove his car into the lead. He would have won if his carburetor had not failed in the turn."

**stick shift** (stĭk shĭft), *n*. Usually signifies a car with a steering-column or floor shift lever, as differentiated from one with an automatic transmission.

**stock by stock** (stŏk bī stŏk), *adj*. Stock bore and stock stroke, i. e., an engine that retains factory measurements.

**stock car** (stŏk kär), *n*. A car in the condition in which it came from the factory.

**straight-through pipe** (strāt thrōō pīp), *n*. A muffler designed to keep power-robbing back pressure to a minimum. It usually is packed with steel wool and does not have the baffles found in a standard muffler.

**stream′lin·er** (strēm′līn·ĕr), *n*. A hot rod with a special body which encloses the wheels.

**street job** (strēt jŏb), *n*. A hot rod designed for comfort, looks and utility; not for racing.

**stroke** (strōk), *v.t*. To increase the distance the piston travels. In a Ford engine this can be done by substituting a Mercury crankshaft, which has the same bearing size but a ¼″-longer stroke. In other engines the crankpins are ground down (after sometimes being built up) so as to give them centers farther out in the crank throw. This pulls piston down farther, pushes it up more.

**strok′er** (strōk′ĕr), *n*. 1. An engine which has been stroked. 2. A driver who is not running his car at full speed; as, he's just *stroking* around, or, he's just a *stroker*.

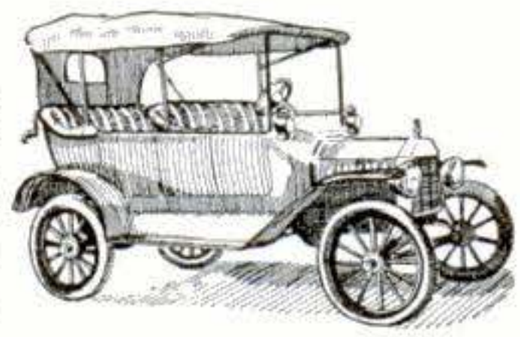
**su′i·cide sus·pen′sion** (sū′ĭ·sīd sŭs·pĕn′ shŭn), *n*. An axle mounted ahead of the frame rails by means of a transverse spring. The spring carrier is welded to the front cross member. If the weld lets go at high speed, the car will go end over end. Hence the name.

## T

**tac, tack** (tăk), *n*. A tachometer, a device for registering the revolutions per minute of an engine.

**t-bone** (tē-bōn), *n*. A Model T Ford.

**torched** (tôrcht), *adj*. Applied to springs that have been reduced in height by heating with a torch and hammering into a new shape if necessary.



T-Bone

**torque arm** (tôrk ärm), *n*. A radius rod.

## U

**u-joint** (ū-joint), *n*. A universal joint, or swivel joint placed in a drive line to transmit power even when the line is not in direct alignment with the source of power.

## V

**vir′gin** (vûr′jĭn), *n*. A stock car in perfect *original* condition.

## W

**wild cam** (wīld kăm), *n*. A camshaft of extreme design, i.e., grind, useful only for racing, not for road driving.



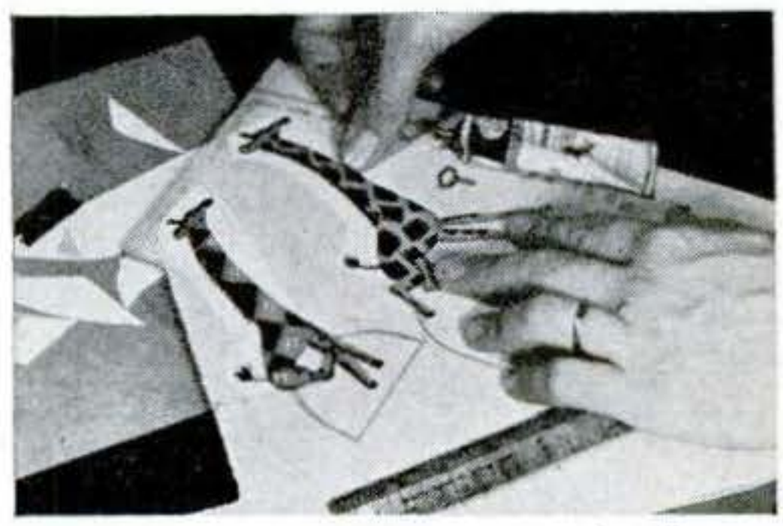
Copyrighted material

# Noah's Ark Animals

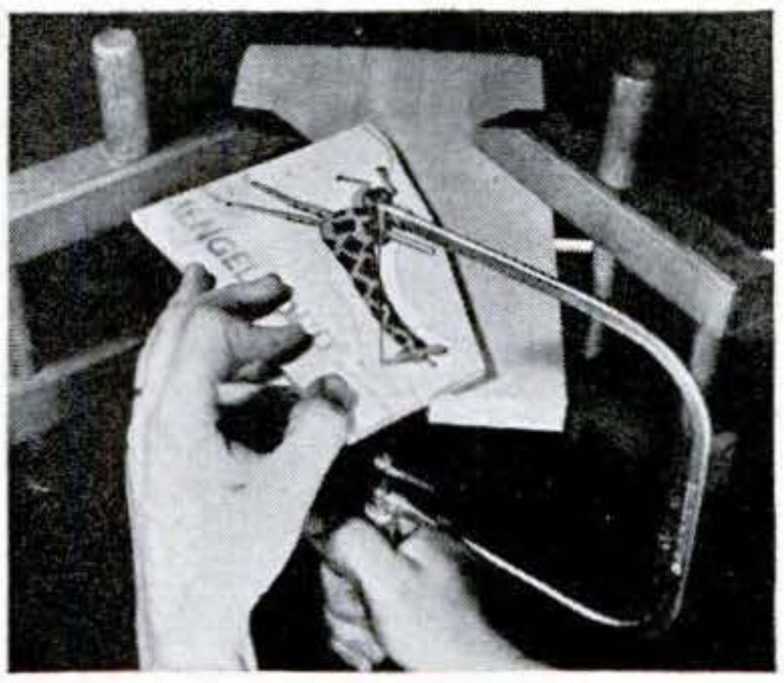
***Turn Pictures into Toys***

PICTURE-BOOK animals come almost to life as they file out of this Noah's ark, for that is just what they are—pictures cut from children's animal books and pasted on wood. The many books available provide as many choices as Noah had, from tame farmyard folk to wild jungle beasts, and you can turn out a whole menagerie for a few dollars and an evening's work.

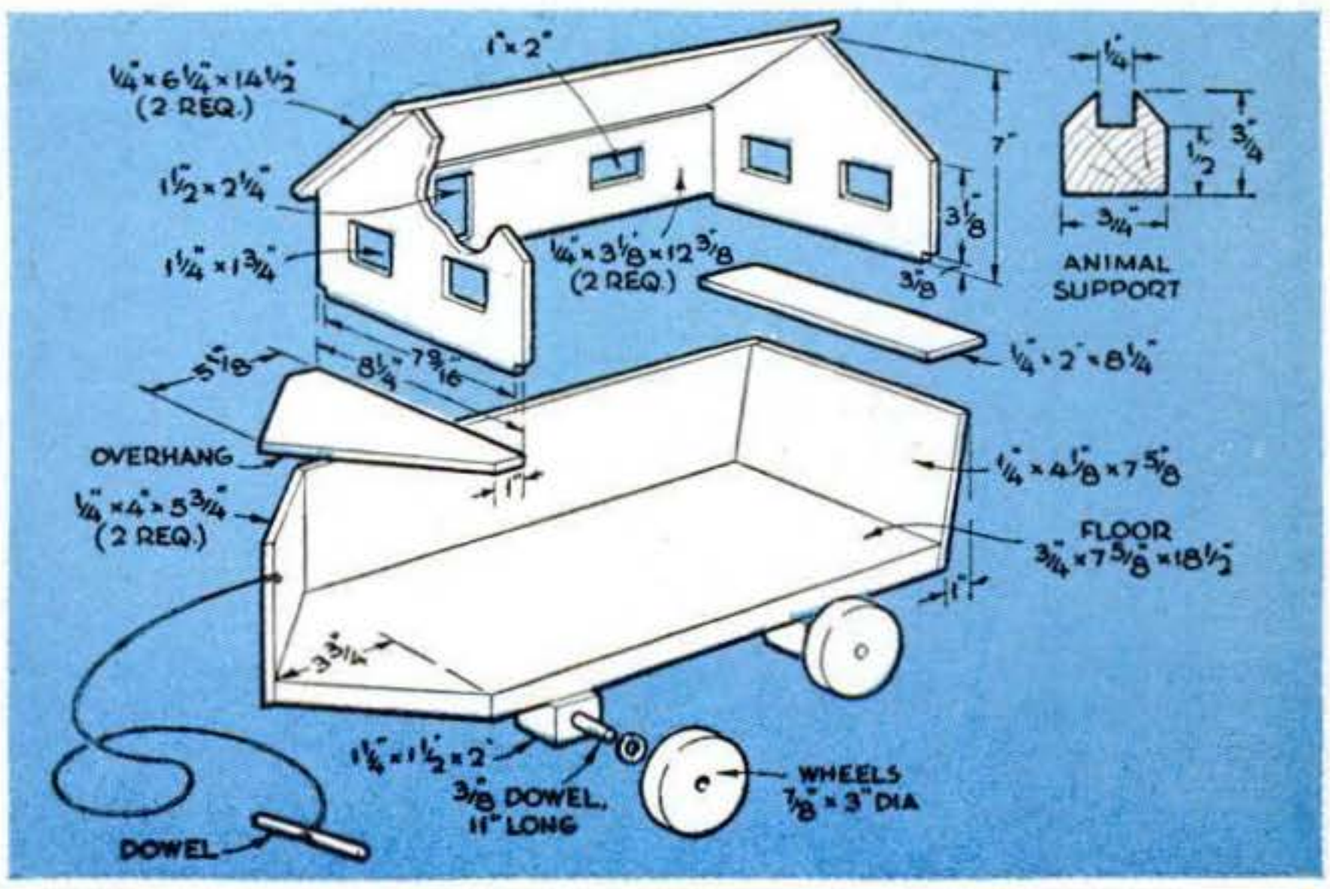
Mount the cutouts as shown at right, glue them into their slotted bases, and they're ready to board the ark. The ark is built in two parts—the hull and the cabin. The cabin can also be used as a house when taken off the hull.—*Karl Greif, Norwich, N. Y.*



**CUT OUT ANIMALS to rough shape and cement to scraps of ¼" plywood. Coat with varnish, let dry, then jigsaw to final shape.**



**BOARD WITH V NOTCH supports plywood for hand jigsawing. For strength, leave wood between legs and other breakable parts.**

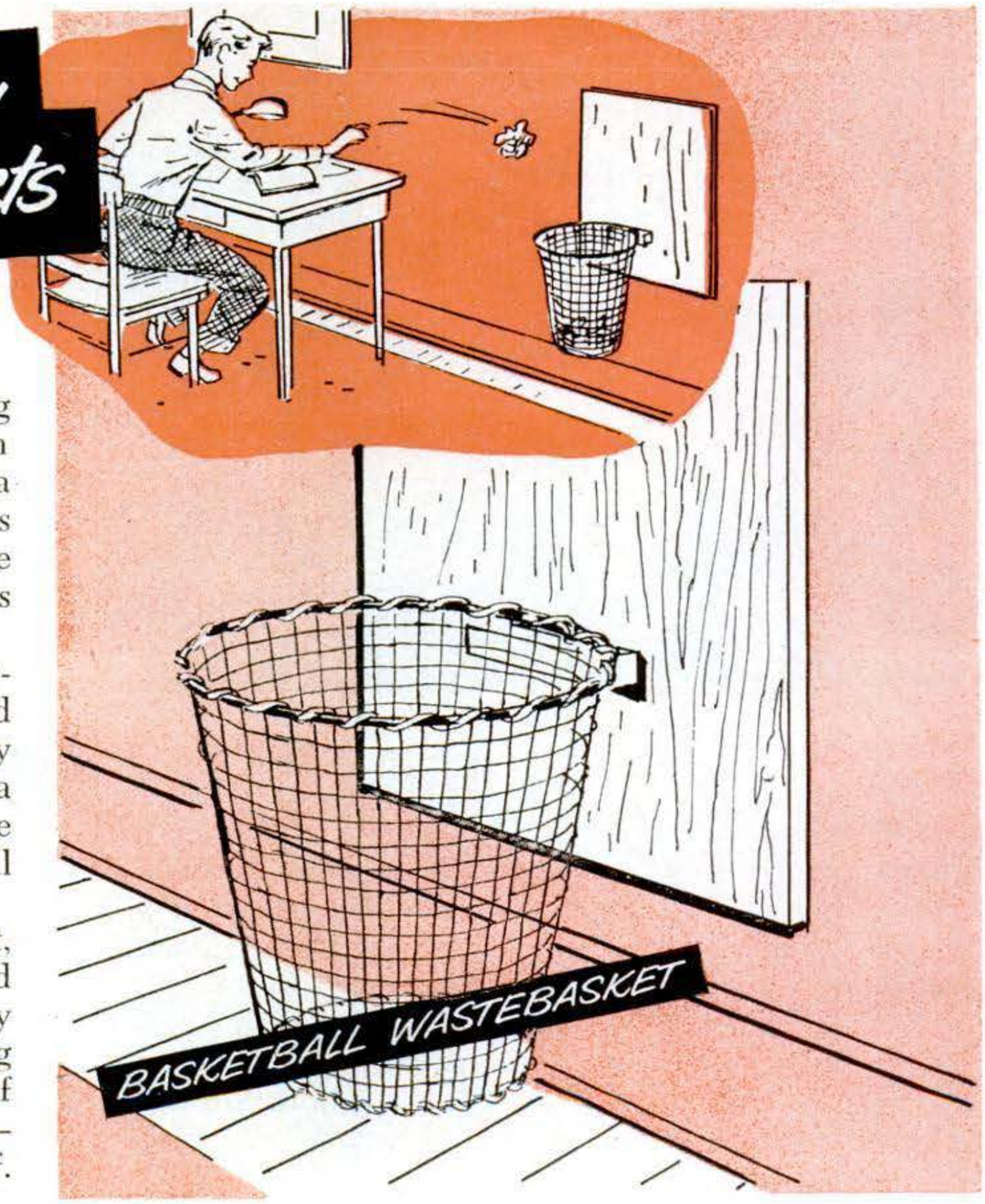



## Miniature Photo Carried on Key Ring

A MINIATURE auto-license tag can easily be converted to a frame for a small photo. Remove the license number by bending up the prongs on the back and insert the photo. A piece of clear plastic will protect the picture. The frame can be carried with your keys, or several frames can be strung together to make a charm bracelet.—*John J. Rea, Urbana, Ill.*

Copyrighted material

# One Evening Shop Projects

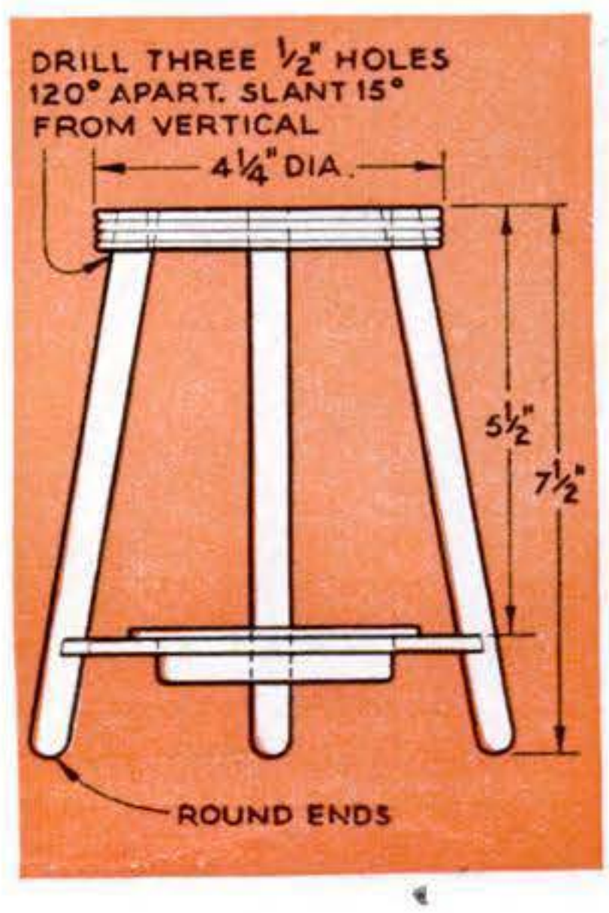


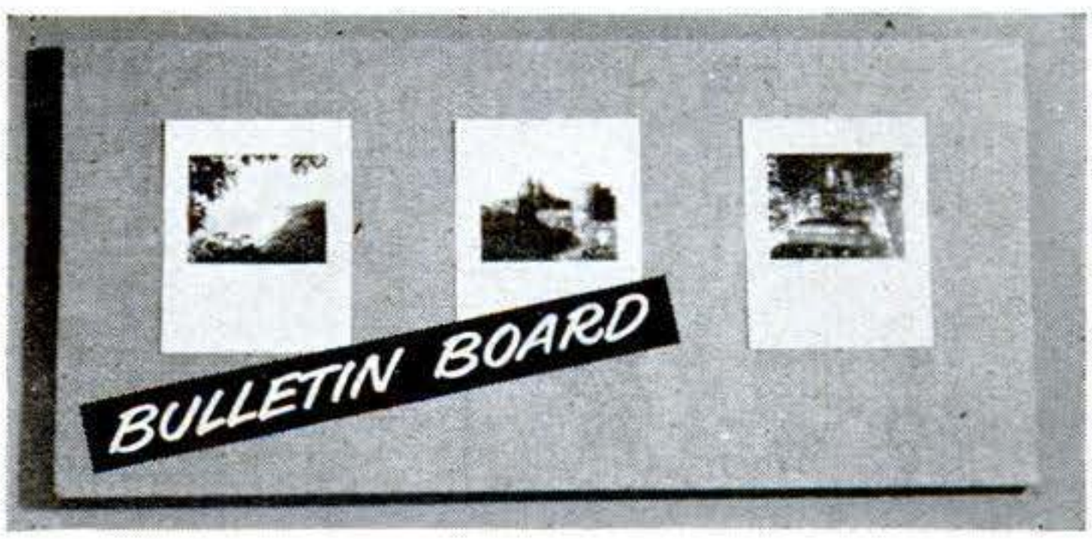

**A boy can practice** making baskets and keep his room neat at the same time if a basketball wastebasket is mounted on the wall. The basket attracts not only wads of paper but the eye, too.

The backboard can be plywood or glued-up scraps and the hoop is easy to shape by hand. For the basket, use a mesh sack that oranges come in. Almost any grocer will give you one.

At the bottom of the net, insert a cardboard disk and sew it to the mesh with heavy cord. The basket can be hung on the wall with a length of wire and a picture hook.—*Paul Fryar, Long Beach, Calif.*

**The unwieldy top** of a vacuum coffee maker finds safe parking in the stand at left. Turn or saw the upper ring from ½″ stock, suiting the diameter of the hole to the sealing ring of the coffee maker. Bead or groove the edge. At 120° intervals, drill ½″ holes at a 15° angle for ½″ dowel legs glued in place. Make the lower shelf of ¼″ stock, notching the edges to fit the legs. Press a flanged ash tray or coaster into the central hole to catch drippings.—*John G. Voelker, Towson, Md.*

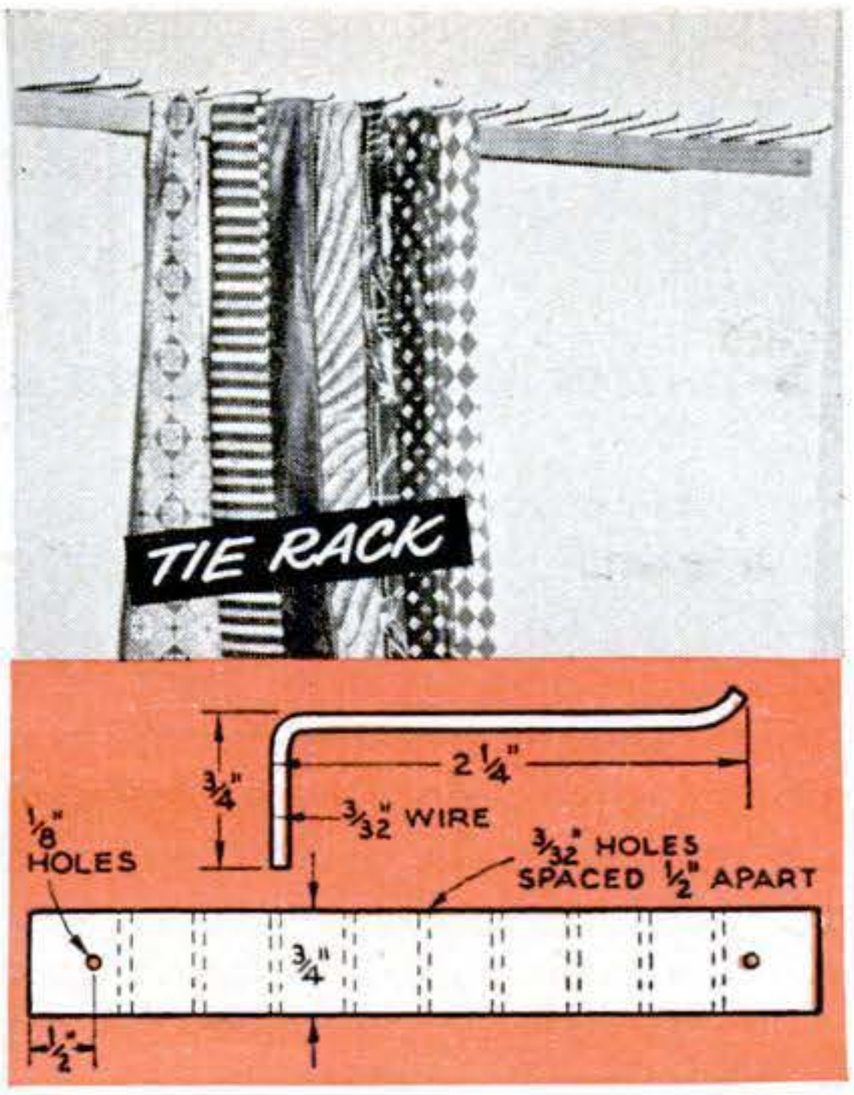



**Shopping lists,** photos and messages can be posted on an attractive but simply made bulletin board. The board is a slab of insulating board mounted on a frame of ¾″ lumber and then covered with burlap. Staple or tack the burlap to the frame. If you use a large piece of insulation, nail one or two vertical pieces into the frame as reinforcements.—*Andrew Takas, Levittown, N. Y.*

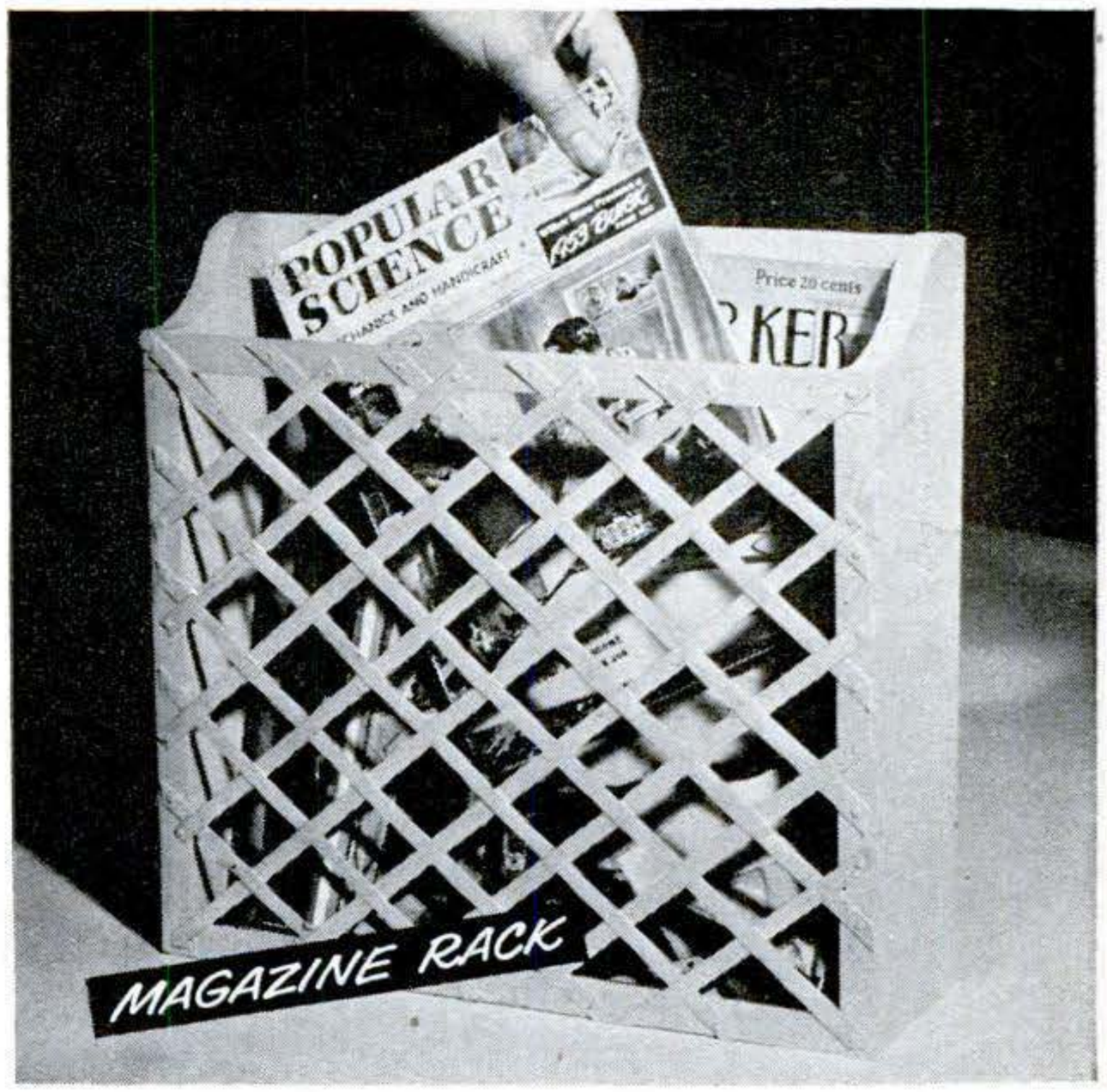


Copyrighted material



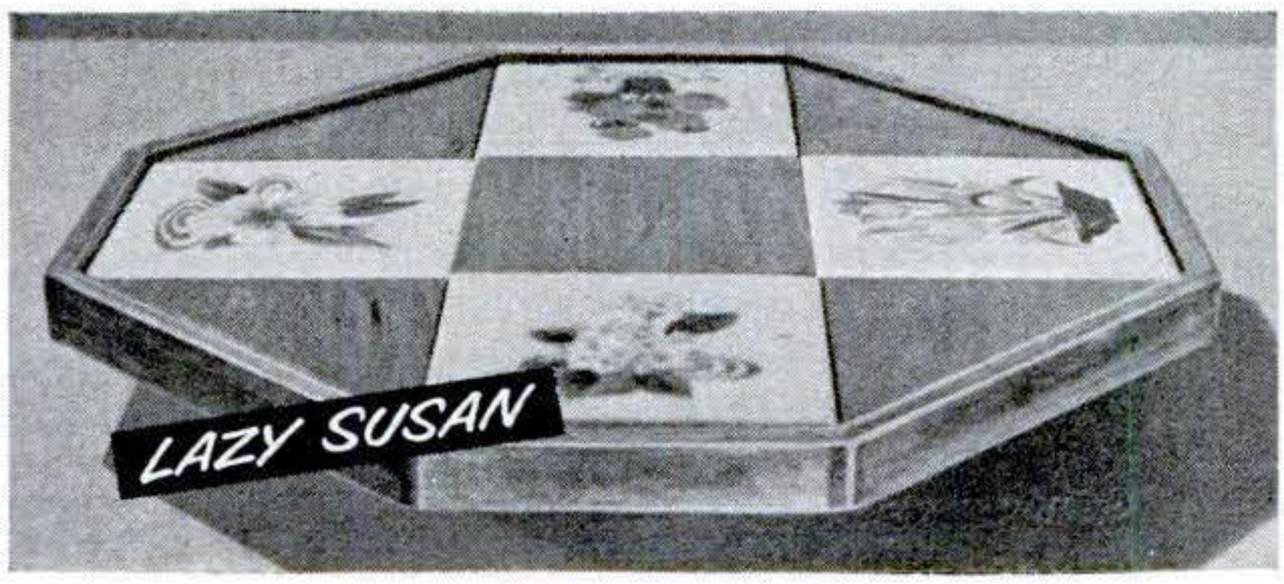

**Ties on this rack** hang separately and out of the way on the inside of a closet door. Cut a piece of ¼" by ¾" hardwood long enough to fit the door. Then drill the holes in which tie hooks will pivot for folding against the door.

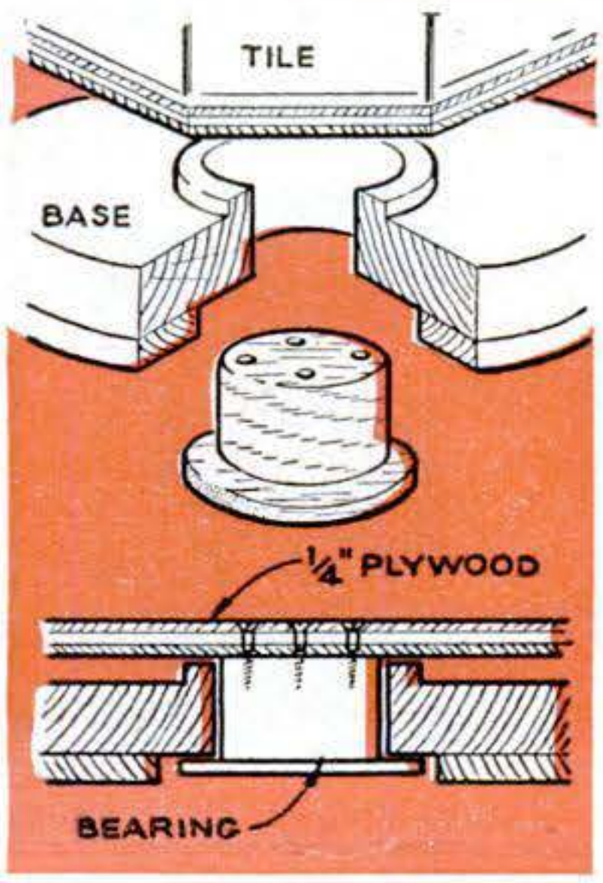
You can bend the hooks from a wire coat hanger. File the upturned ends smooth and remove any burrs that might catch in the fabric.




**Magazines** stored in this stand will always be handy. You can place it on the floor or a table, or hang it on a door. The back is a piece of ¼" plywood 12" square, glued into rabbets in the 4"-wide sides and bottom.

The grid is made of iron strapping—the kind used on packing cases. If you can't scrounge enough, you can buy it at a hardware store. Assemble it with rivets and nail on.—*B. Brownold, Cedarhurst, N. Y.*

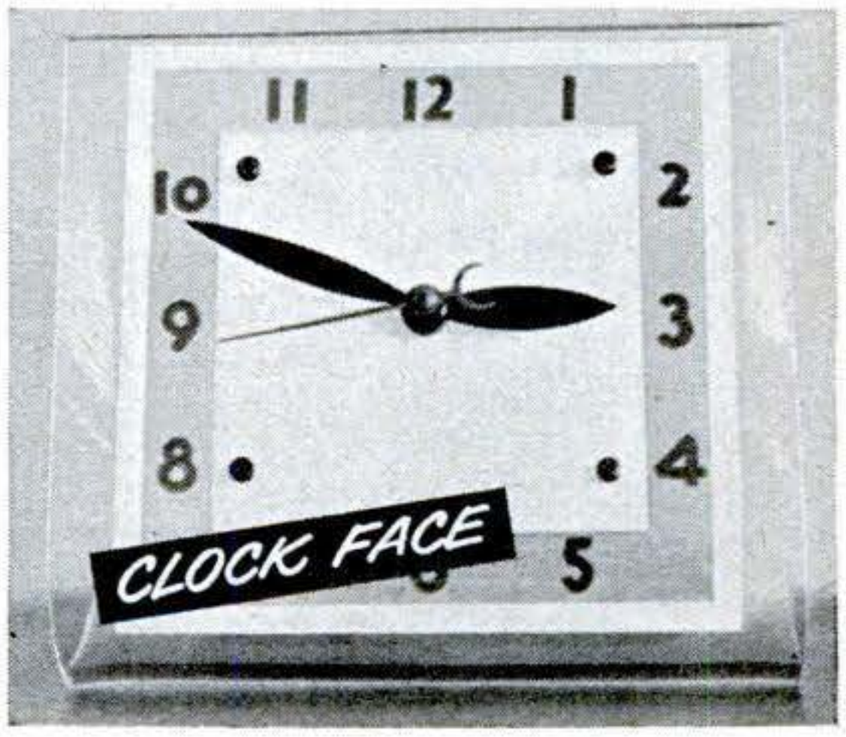



**Bright tiles** in the top of this lazy susan add color to a table. Use four square tiles and filler pieces of nicely grained wood the same thickness as the tiles. Glue fillers to a piece of ¼" plywood and secure the hardwood frame with glue and screws. The bearing in the base is made of two burned pieces. Rub paraffin on the friction surfaces to make them free-turning.

**Here's a new** money-saving use for your camera and darkroom: putting a new face on an old clock.

I took the hands off a different clock that had a good face and photographed the face. Then I blew up a print to the proper size and cemented it over the old scarred face. A square of light cardboard was used to cover the center of the copied face as shown below.






Copyrighted material

# Can You Change

***It's not much harder than changing an***

ONE dark night you may be jolted out of your sleep by a roaring gusher of scalding water and steam blasting across your basement for no reason at all. No reason, except that a water tank has overheated toward danger. Thanks to an ingenious little safety fuse, called a TPR valve, it has been kept from blowing up you and your house. (See "Water Can Be Dynamite," PSM, Feb. '51, p. 156.)

It could happen anytime, whenever an overheated coil, stuck thermostat or some other defect in the heater causes the water to get too hot. Now, before it happens, is the time to learn what to do if it does.

***How the valve works.*** A TPR valve, as plumbers call it, is a two-in-one valve that lets water escape safely from the tank whenever either its temperature or pressure gets too high (thus T for temperature, P for pressure and R for relief).

The pressure half of the valve is a stem held tightly closed by a spring. If too much pressure builds up, it overcomes the spring and the valve opens to let the water out. The temperature half is a plug of fusible metal that melts away if the water gets too hot, letting it escape before it flashes into explosive steam.

***Replacing the fuse.*** The fusible-metal plug is something like an electric fuse—once it has melted away, it's gone and must be replaced with a new one. Usually an extra plug is kept in a bag tied to the valve, but if you can't find one, better note the make and model of the valve and buy a few spares at a plumbing-supply shop. When you need one, you'll need it bad.

The photos on the opposite page show how a fusible plug is installed in one common type of valve. But there are many makes and models on the market, so a little study of yours now will save time later. And remember, a blown water fuse, like an electric one, is only a symptom of more basic trouble elsewhere. After you've replaced the plug, make sure that the original cause has been corrected before you attempt to fire up the heater again.

***Know your heater.*** Not all safety valves are of the temperature-pressure type. Some relieve only under temperature, others only under pressure. Some electric heaters have thermostatic valves that open when the temperature gets too high, then close again to keep too much water from draining away and burning out the heating elements.

Find out from a plumber or heating expert exactly what kind of valve you have and whether it is giving you full protection. If you have the wrong type, or none at all, better get the right one quick.

And don't do what I once did. Mistaking a plain pressure valve for the TPR type, I proudly assembled the family and started to remove the valve cap to show them the fusible plug. After we dried ourselves off, we could laugh about it. But if the water had been a little hotter, it wouldn't have been funny.—*E. F. Lindsley, North Prairie, Wis.*

### Stick Pushes Furnace Button for You

AUTOMATIC gas furnaces that require a starter button to be held in half a minute or longer while the pilot is lit are hard for one person to operate.

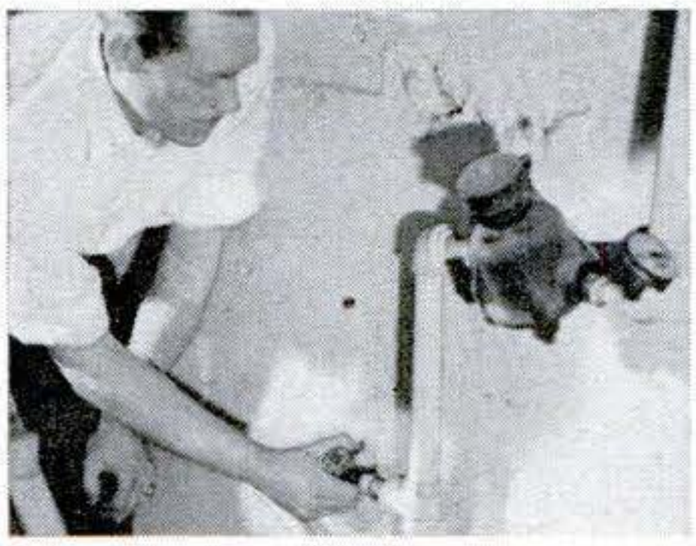
A short dowel cut to the right length and wedged in between the button and the floor (right) will hold it in for you. *Be very sure to remove the stick afterward so as not to leave the button pushed in.*

To keep the stick handy, drill a hole through one end, attach a hook bent from coat-hanger wire, and hang the dowel over the pipe near the button (left).—*Burl Knutson, Bismarck, N. D.*

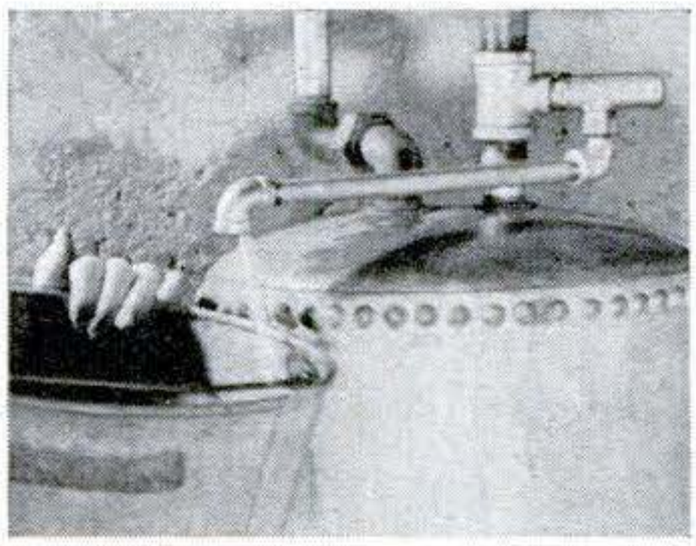
Copyrighted material

# Your Hot-Water Fuse?

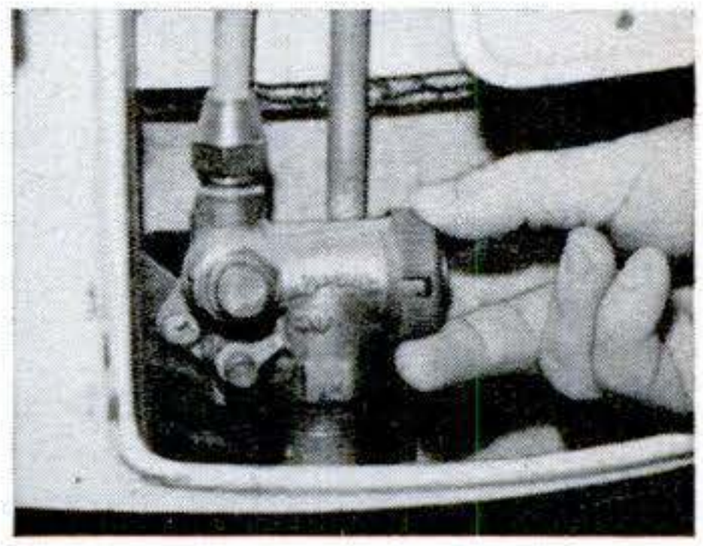
***electric fuse—but may be a lot worse if you're caught unprepared.***



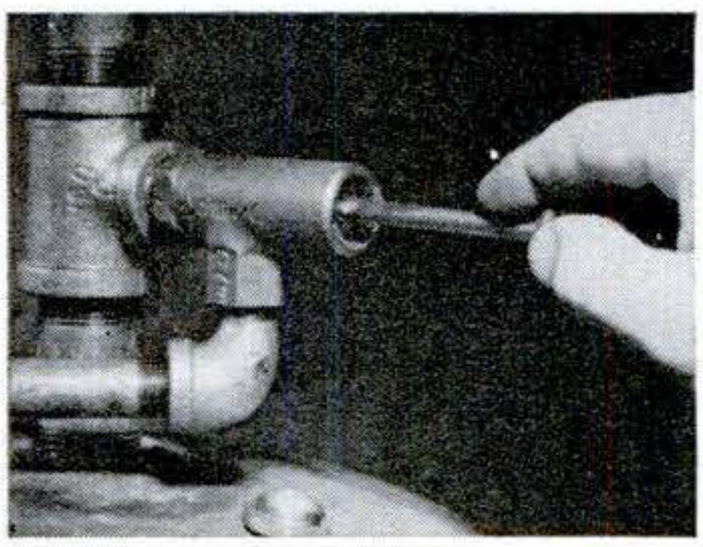
**1. When valve blows,** turn off water quickly, either at main house shutoff, as here, or at heater itself if yours has separate shutoff. Using latter won't deprive rest of house of water while repairs are made.



**2. Bucket kept handy** will save some mopping up, but be careful—water may be scalding hot. Better bet is to run a pipe to a floor drain or sink. Here, TPR valve is in tee (right above).

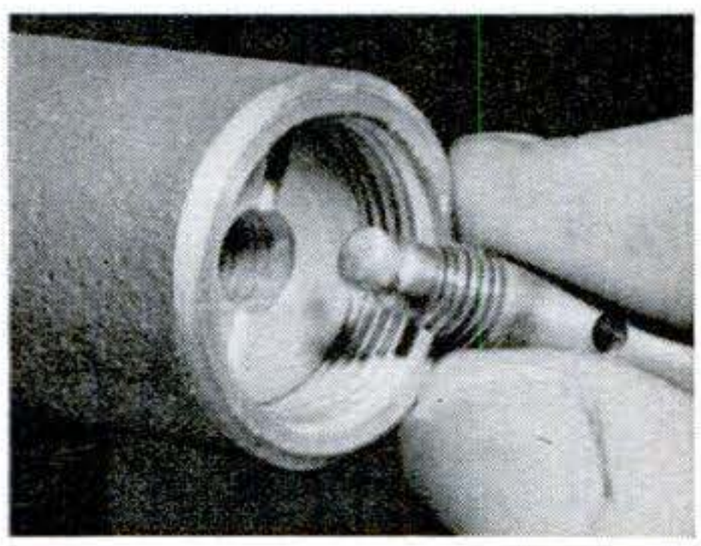


**3. Shut off gas** to heater to prevent trouble if unit is defective. Here, valve is at base, but others may be elsewhere. Know where yours is. If heater is electric, cut power at switch box (there may be two switches).

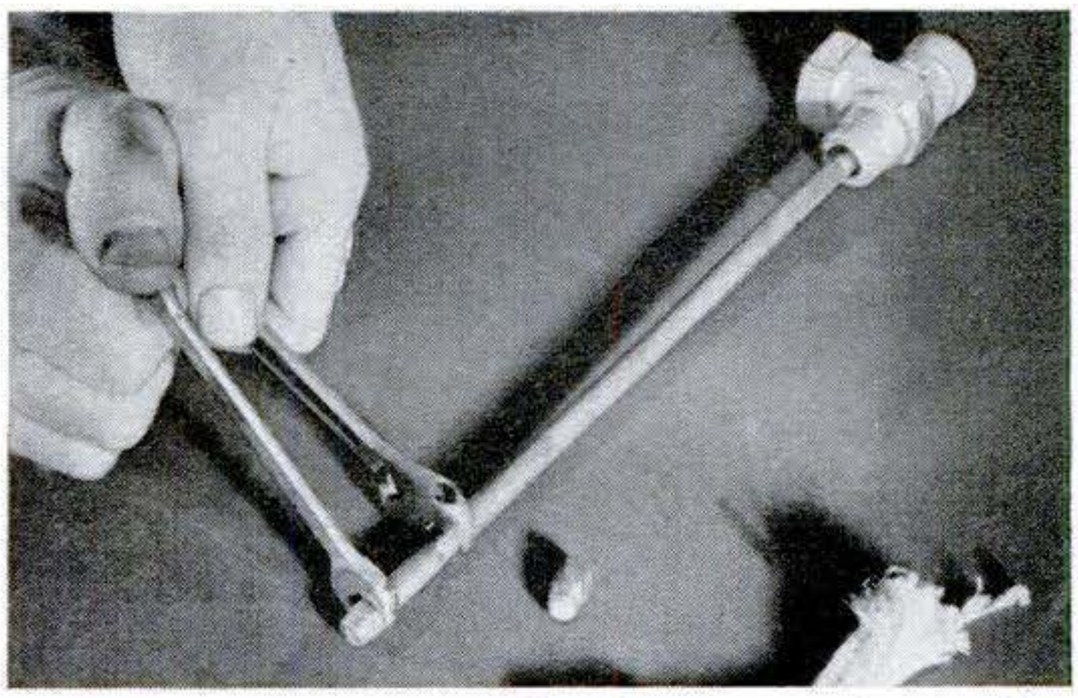


**4. Remove cap** from TPR valve, then unscrew small plug, as above, from center of large slotted plug. Do not disturb large plug; it has been permanently set at proper pressure by installer.

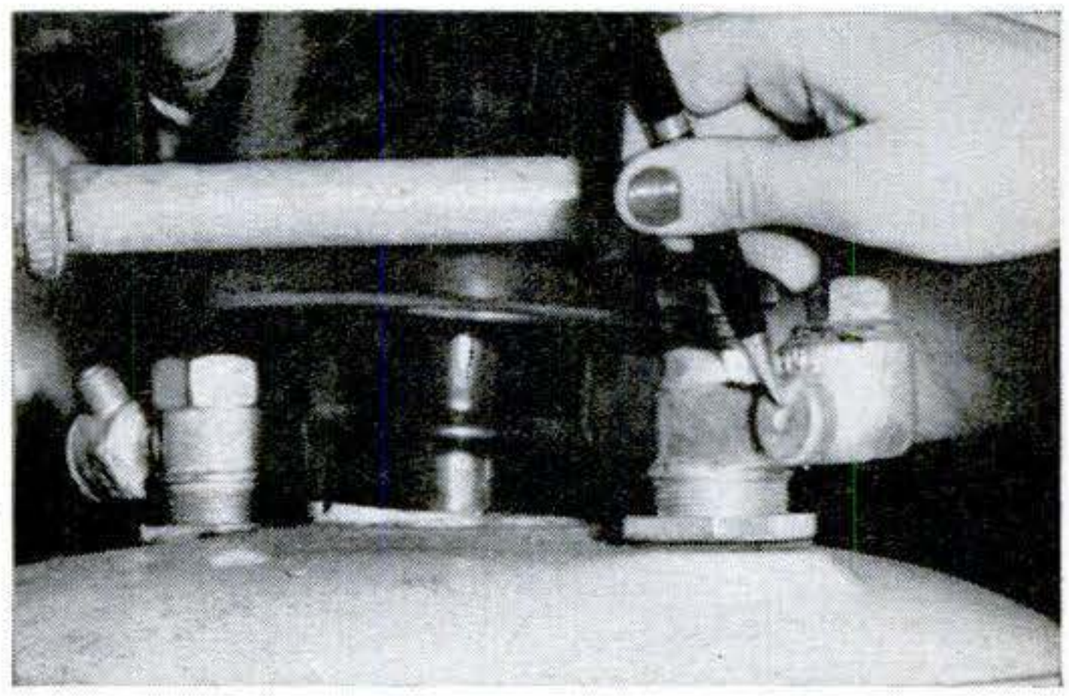
**5. The empty chamber** in inner end of small plug shows where fusible metal was before it melted out. Shine light into valve and make sure scale or rust will not impair seating of new plug.



**6. Insert new slug** of fusible metal in plug tip and screw plug back in. Replace valve cap and job is done—provided you've fixed original cause. Always keep a spare plug in a bag tied to the valve.



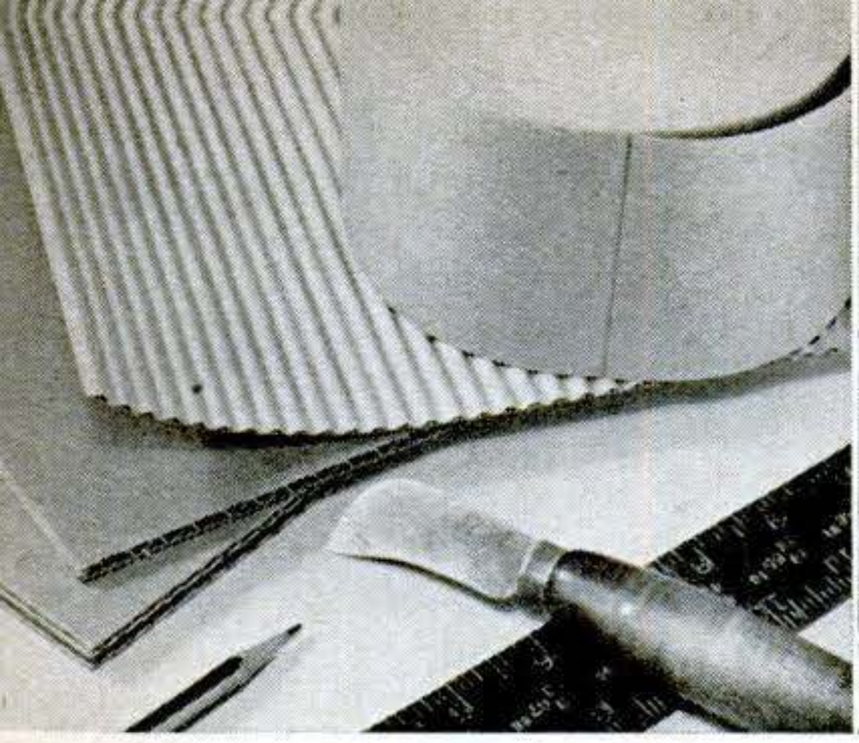
**Another type of valve** has long stem that sticks down into water. Since fusible metal is part of tip cap, entire valve must be removed from tank to get at it. Otherwise, replacement job is similar. Get to know what kind you have.



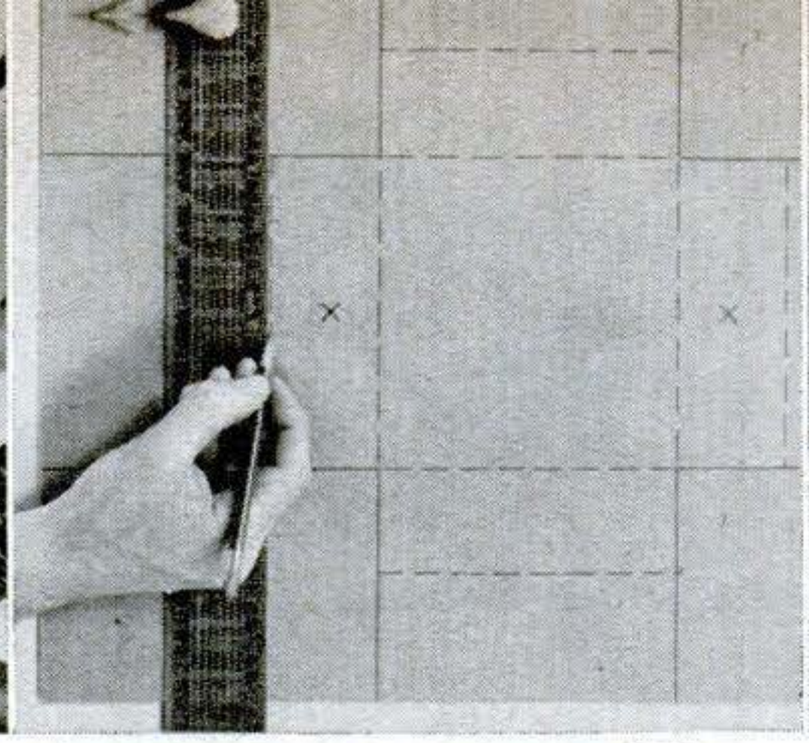
**Partial installations** aren't unusual. Here a plug (pencil) is where TPR valve should be, but pressure valve in left background gives some protection. Old practice under some codes counted on reversible water meters for protection.



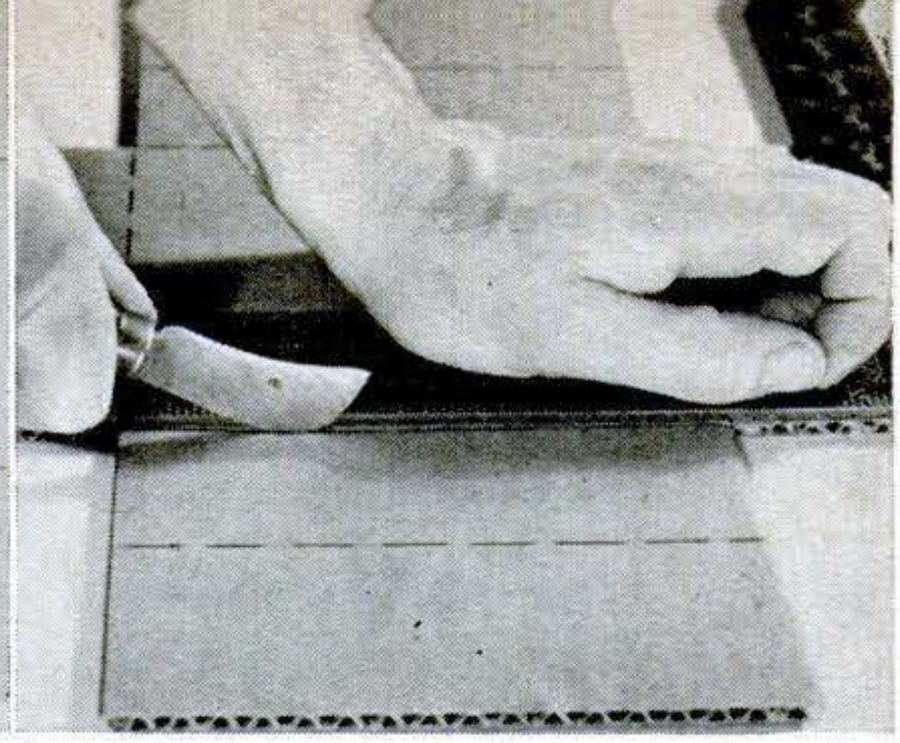
Copyrighted material



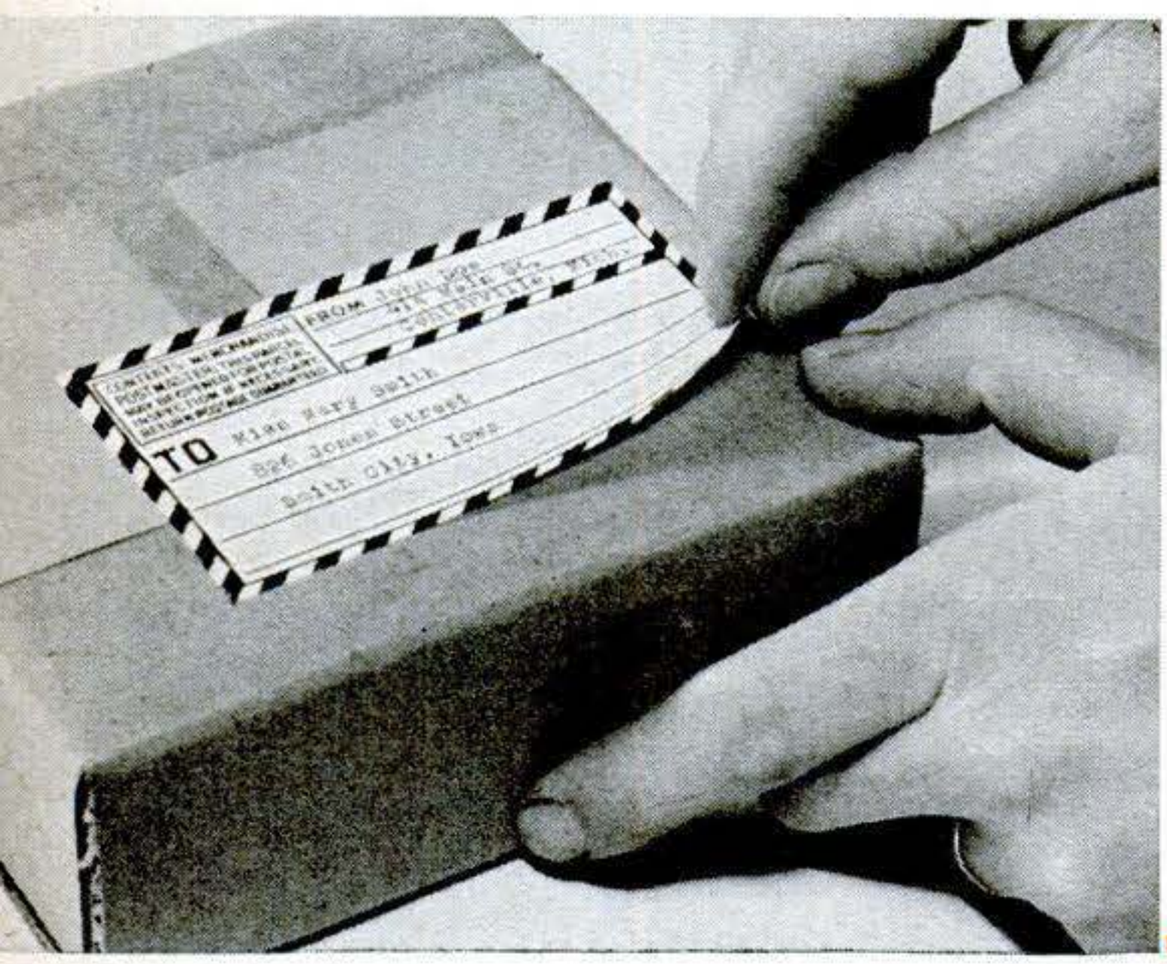
**1 MATERIALS** are double-faced corrugated cardboard and gummed paper tape. Unfaced flexible cardboard is good for lining only.



**2 DOTTED LINES** indicate folds, solid lines cuts. For a box 6″ square by 2″ deep, a sheet of 15″ by 18″ cardboard will do the job.



**3 FOLD LINES** can be scored with back of knife. Pressure should be firm but back of knife must not break through surface of cardboard.



# Cardboard

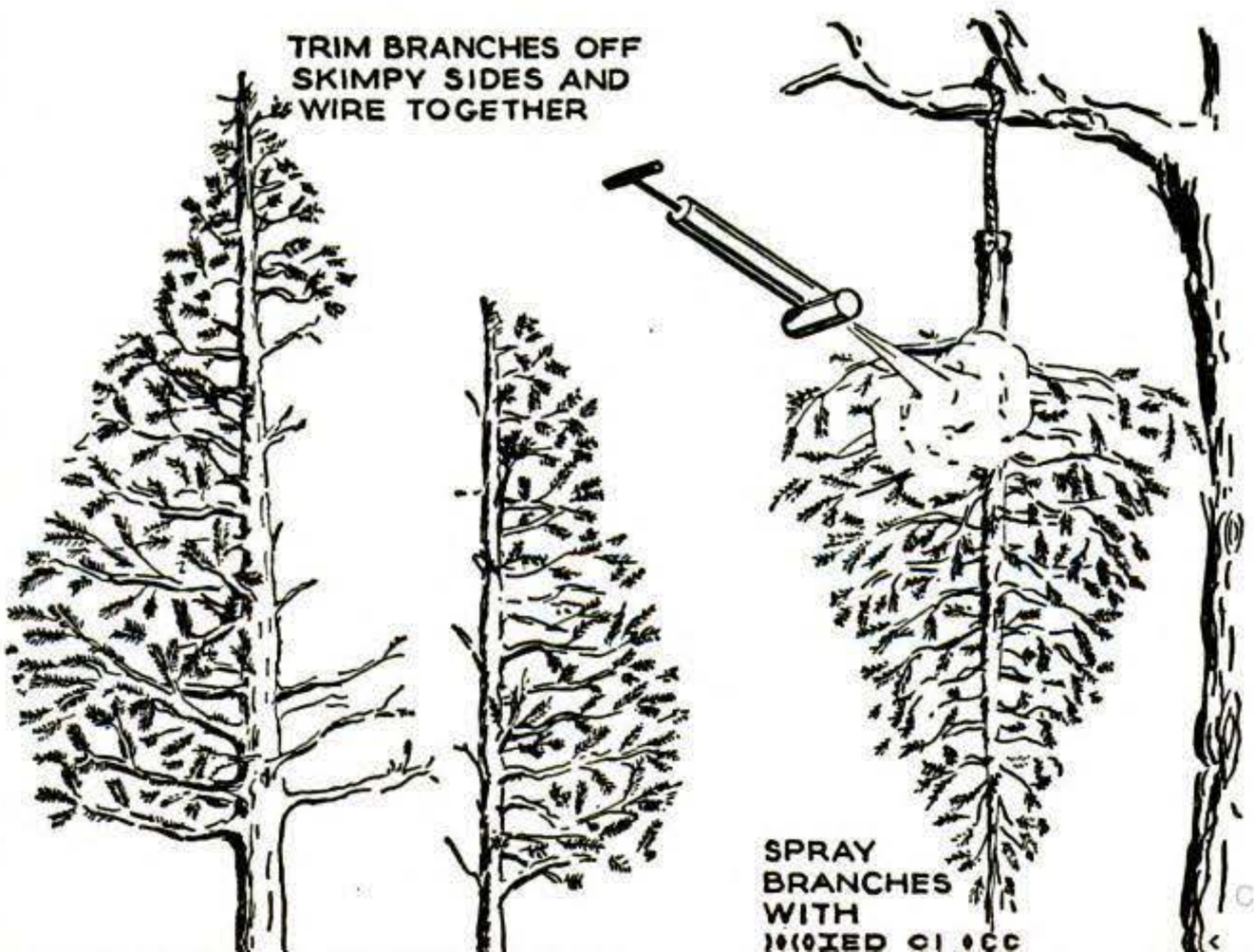
***Three simple***

WHILE you may not believe that the holiday mails are shipped by concrete mixer, there's no need to put this faith to the test. Damage in transit can be largely eliminated by good packing, for most gifts

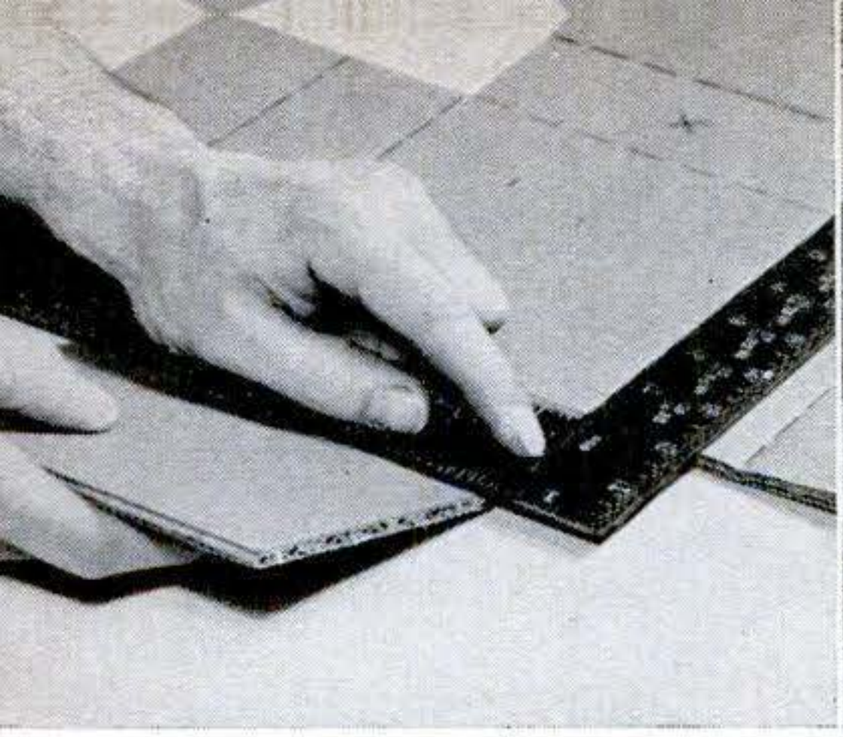
## How You Can Fatten Up That Undernourished Christmas Tree

THREE skimpy trees made the full, symmetrical one shown in the photo at left. Trees often grow with sparse branches on one side. Lop off what branches there are on the weak side and wire on a healthier section from another tree. Check symmetry from several angles before cinching up the wire.

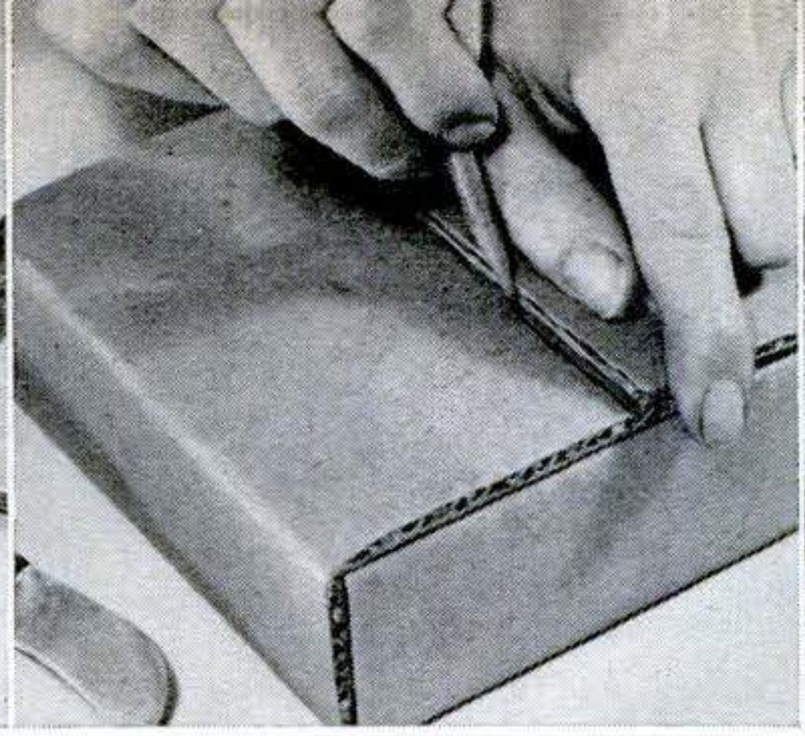
To fireproof a tree, spray it with water glass (sodium silicate). Then hang it upside down and spray the underside of the branches.




Copyrighted material



**4 STEEL SQUARE** or any straight edge can be used as guide to make bends. You'll have to flatten bent parts to make the next bend.



**5 MARK TOP FLAP** when box is closed tightly. Then unfold and trim excess off one flap so that the two top flaps meet neatly for wrapping.

**6 PACK** fragile articles in roomy box with plenty of shredded paper or excelsior. Sides can be reinforced by folding extra strip inside.

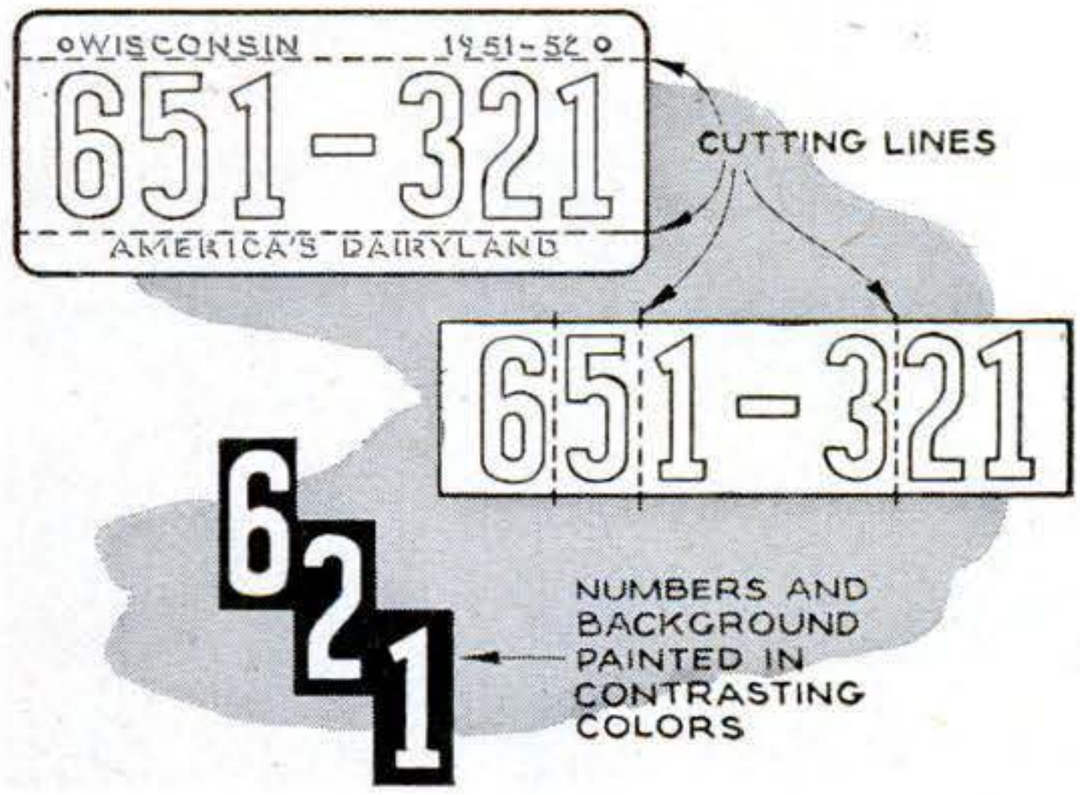
# Mailing Boxes Protect Gifts

***tools quickly change cardboard into sturdy shipping cartons.***

a sturdy carton of corrugated cardboard.

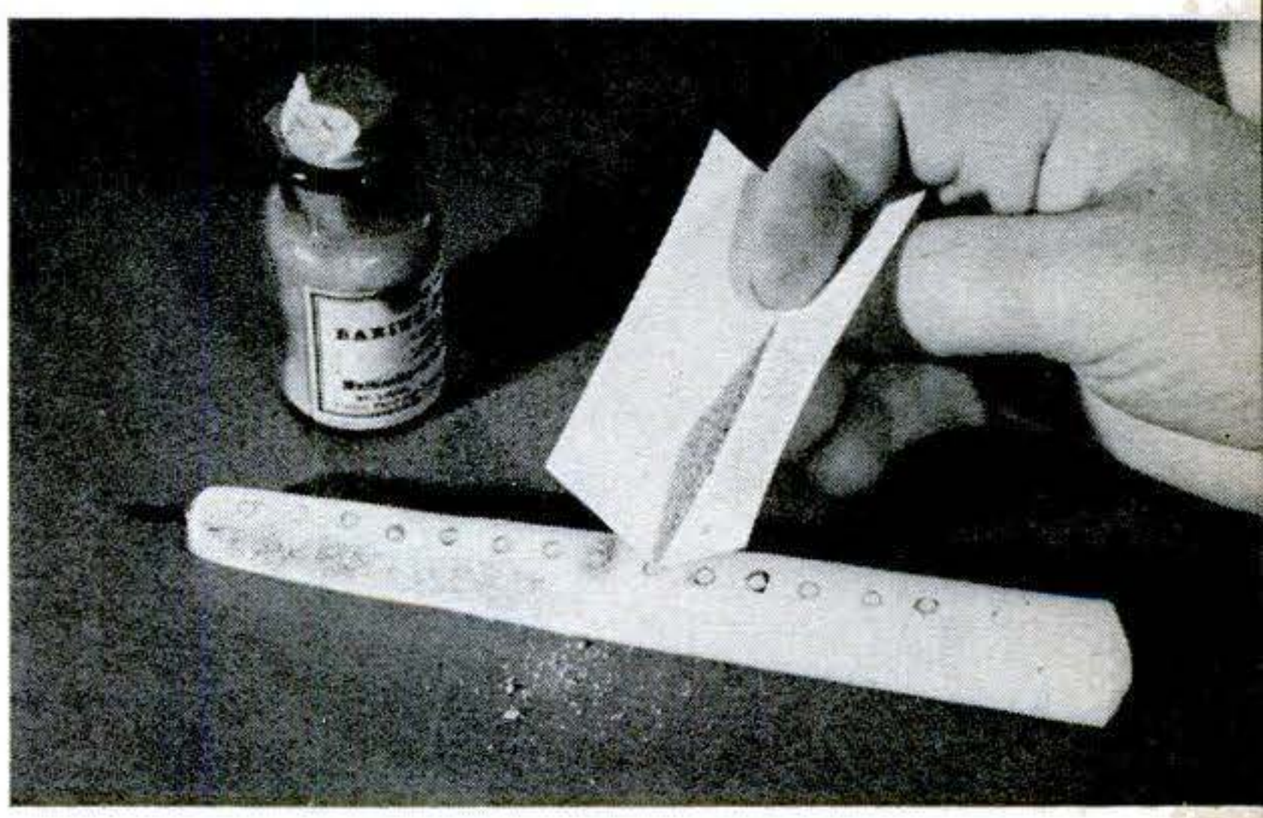
Getting a box of just the right size is important; if it's too big the gift will careen around inside; too small and you have to skimp on protective packing. To make strong mailing cartons that are just right to package your gifts, follow the steps illustrated above. The only tools you need are a knife, square and pencil.—*Clyde L. Allison, Cadillac, Mich.*

## Numbers Cut from Licenses




OLD auto license plates are a handy source of embossed metal numbers for houses, cabins or boats. To keep the numbers from curling, cut them out in a line first and then cut them apart. Leave a uniform ¼″ margin at top and bottom. Drill small holes to mount the numbers with screws or nails.—*Thomas P. Ramirez, Fond du Lac, Wis.*

## Burning Candle Changes Color

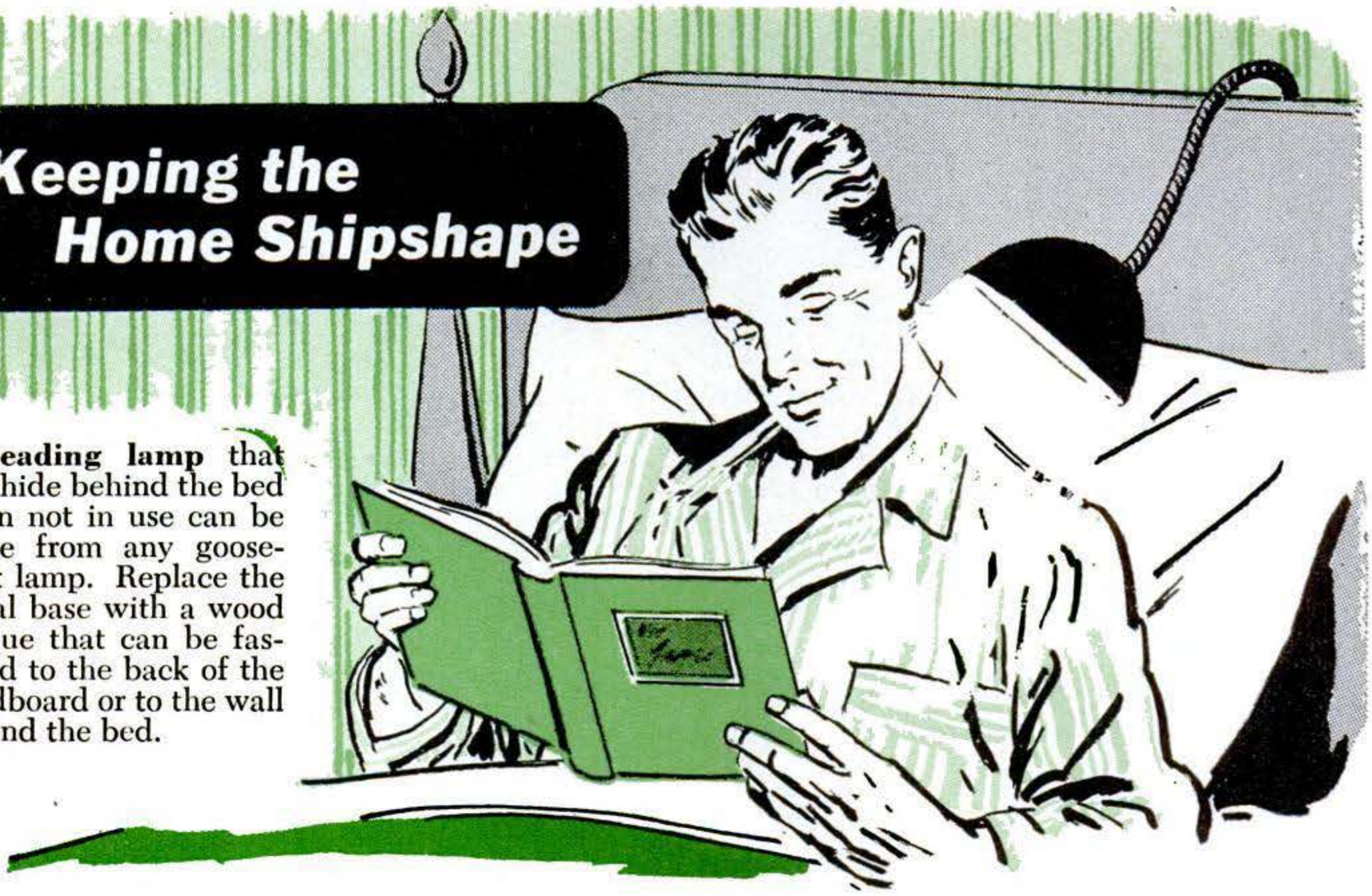


THE flame of this candle will change color as it burns. Drill small holes ½″ apart down the side and fill them with small amounts of these chemicals: copper or barium nitrate for green; strontium nitrate for red; lithium chloride for purple; calcium chloride for orange; potassium nitrate for yellow and magnesium powder for white. Close holes with wax.—*Ken Murray, Colon, Mich.*

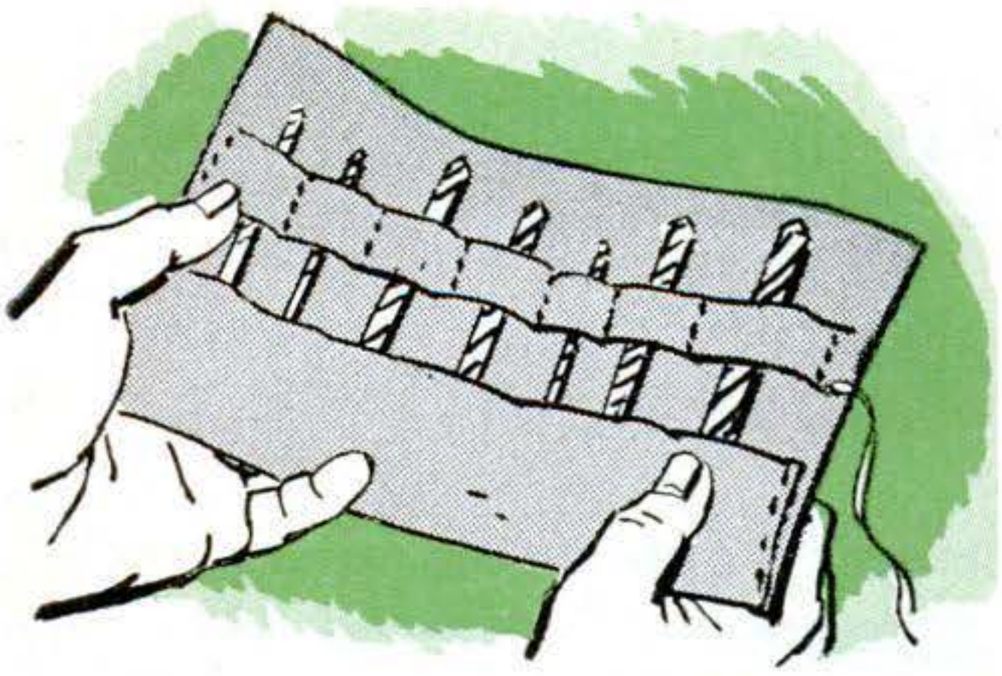


Copyrighted material

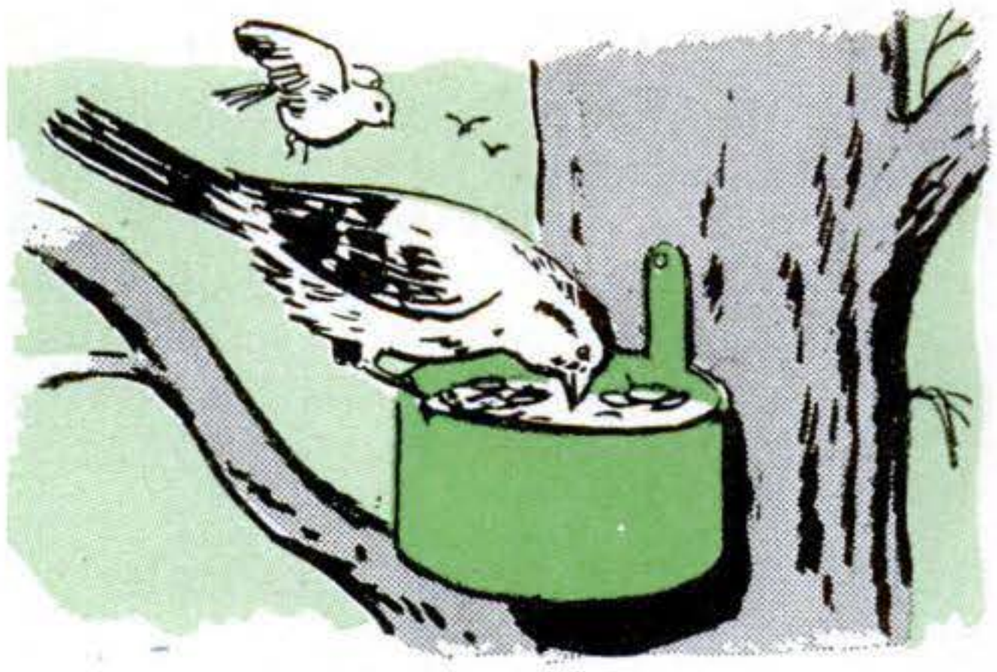
# Keeping the Home Shipshape



**A reading lamp** that will hide behind the bed when not in use can be made from any gooseneck lamp. Replace the metal base with a wood plaque that can be fastened to the back of the headboard or to the wall behind the bed.

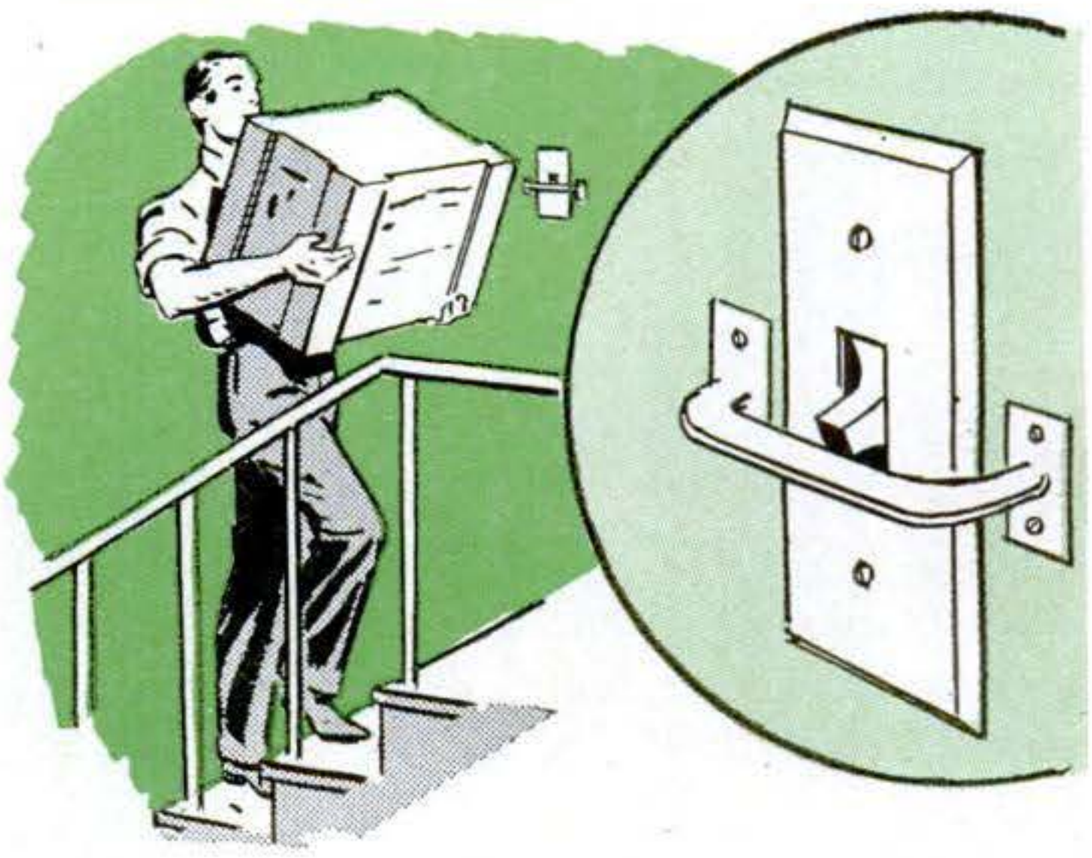


**A drill case** cut from a man's felt hat can be saturated with oil to protect the tools from rust. When rolled up for storage, the case takes up little room.



**Weatherproof bird feeders** are easily cut from plastic bottles. Snip a bottle at the halfway mark, leaving a tab at one side so that it can be tacked to a tree or pole.

**When tying packages** for mailing, dampen the cord or twine with a wet sponge to make a tighter job. When the moistened string dries, it will tighten up a little.

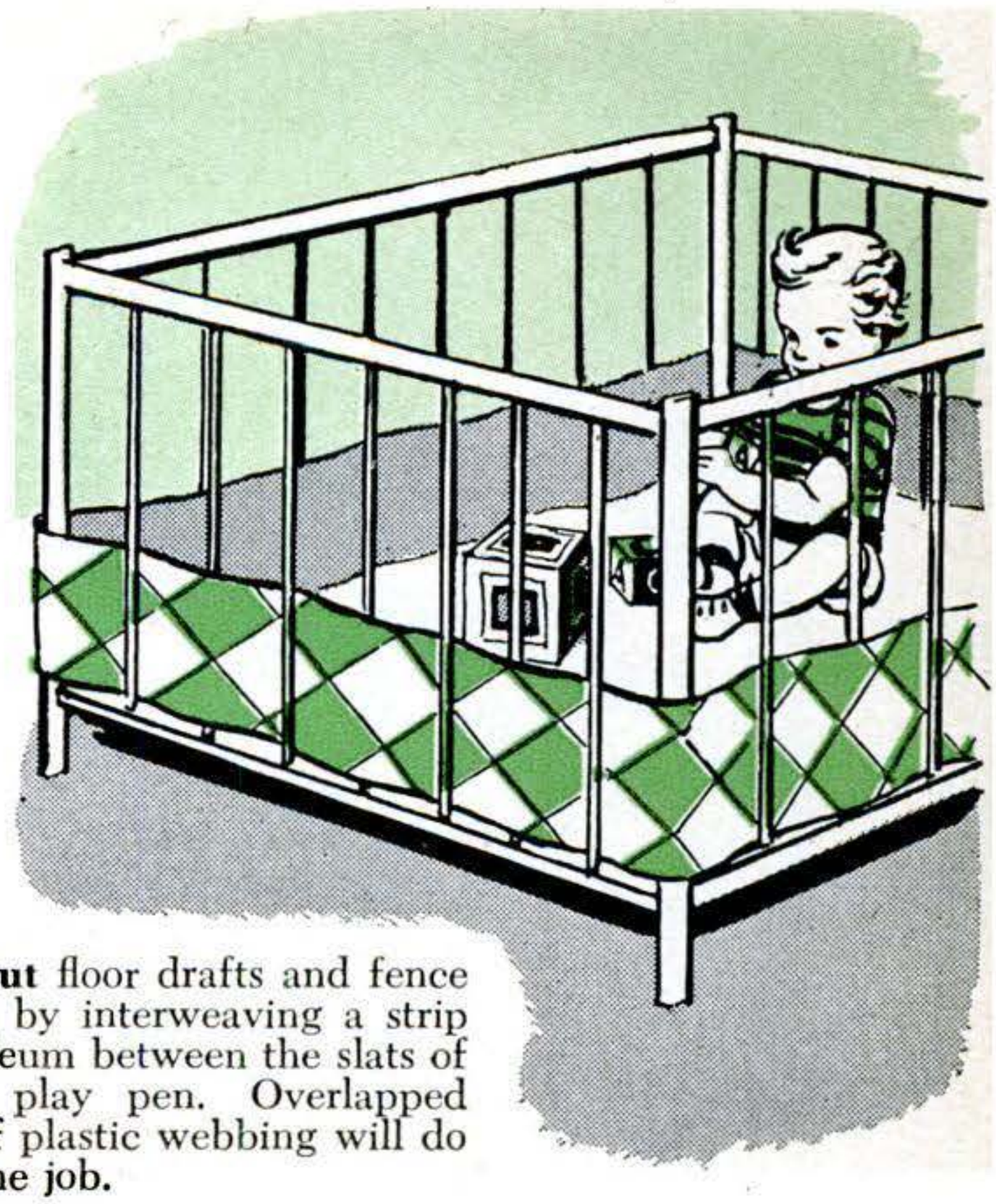


**An oil-burner switch** on the wall beside a basement stairway should be protected from large objects carried past it. A door handle makes a simple guard.



Copyrighted material

**Stamp 'em fast** with a mechanical licker and save your tongue when sending out batches of Christmas cards. A water-filled deodorizer bottle with fiber wick makes a good licker.



**Wall out** floor drafts and fence in toys by interweaving a strip of linoleum between the slats of baby's play pen. Overlapped rows of plastic webbing will do the same job.

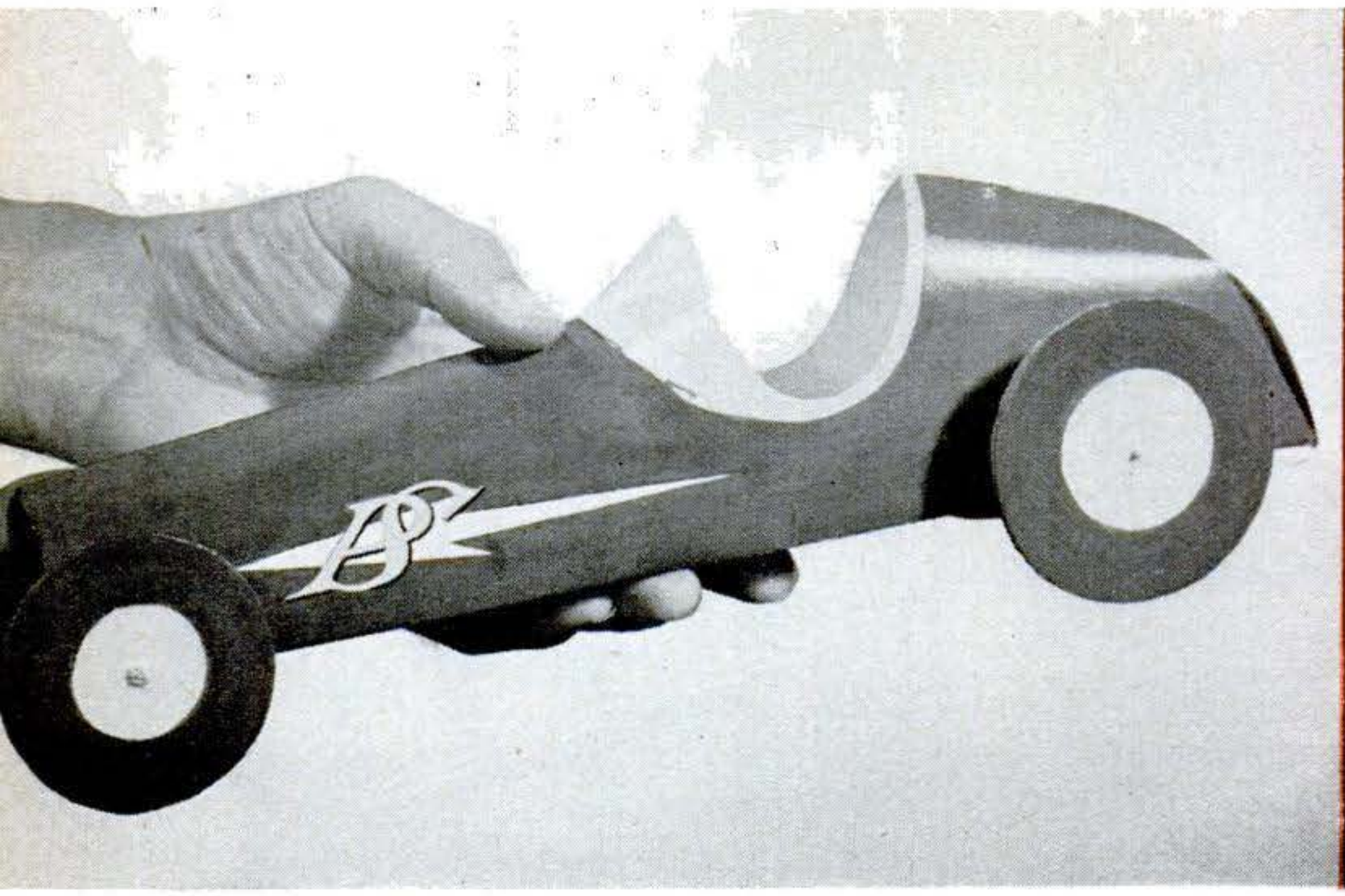
**To tie** a ribbon bow with a single knot, use a pushpin as an extra hand to hold the knot tight. Push it through knot and box, tie the bow tight and withdraw the pin.

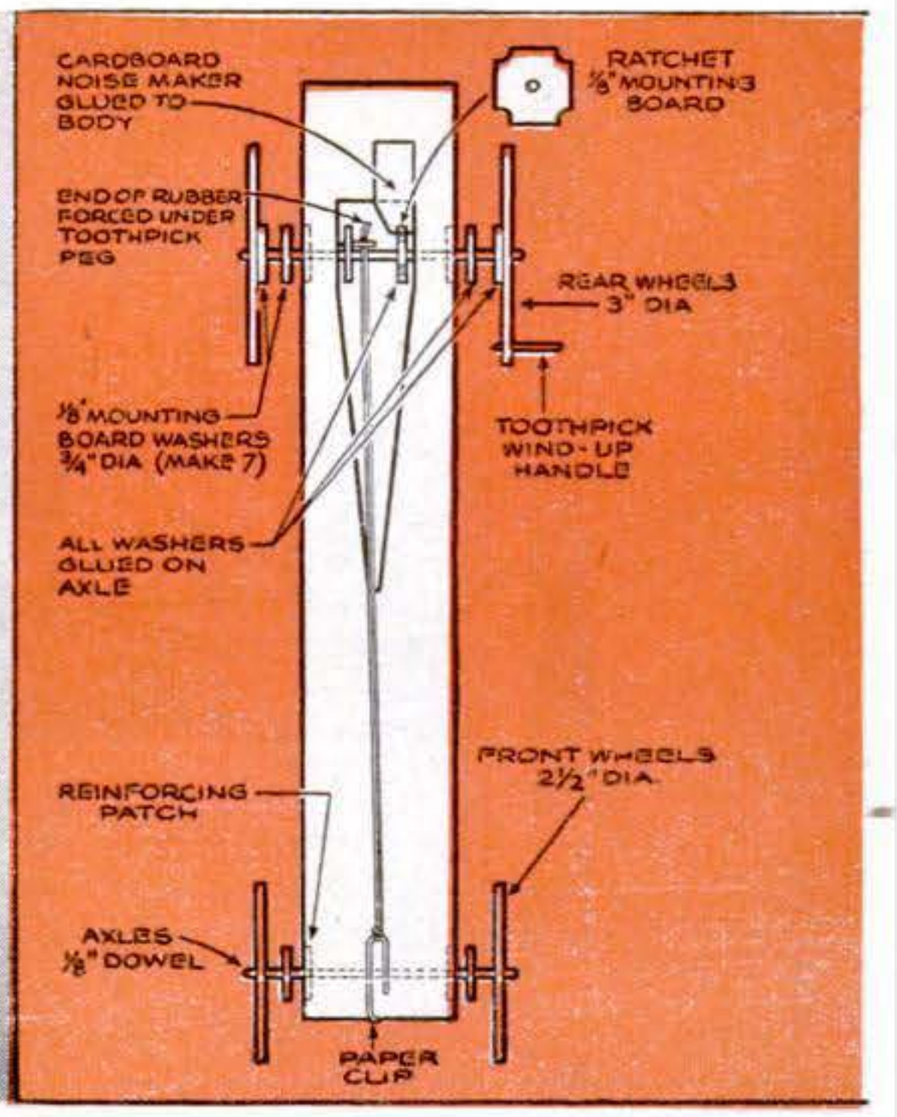
**To pour paint** without a funnel, hold a stick or a pencil across the mouth of the pouring can. The projecting end of the stick will guide the paint flow.

**A laundry rack** makes a good stand on which to park freshly painted work for drying. Flat pieces rest across the bars; odd shapes can be hooked over them.



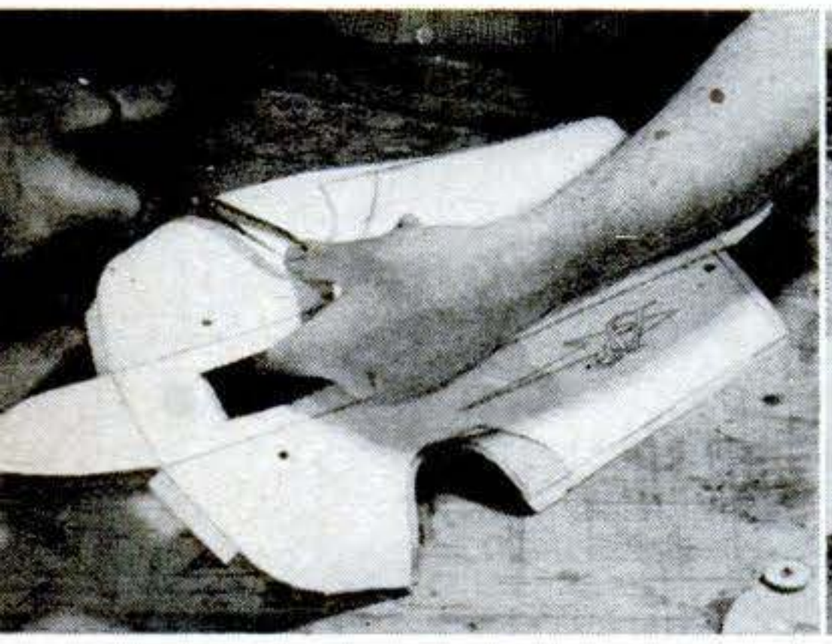
Copyrighted material



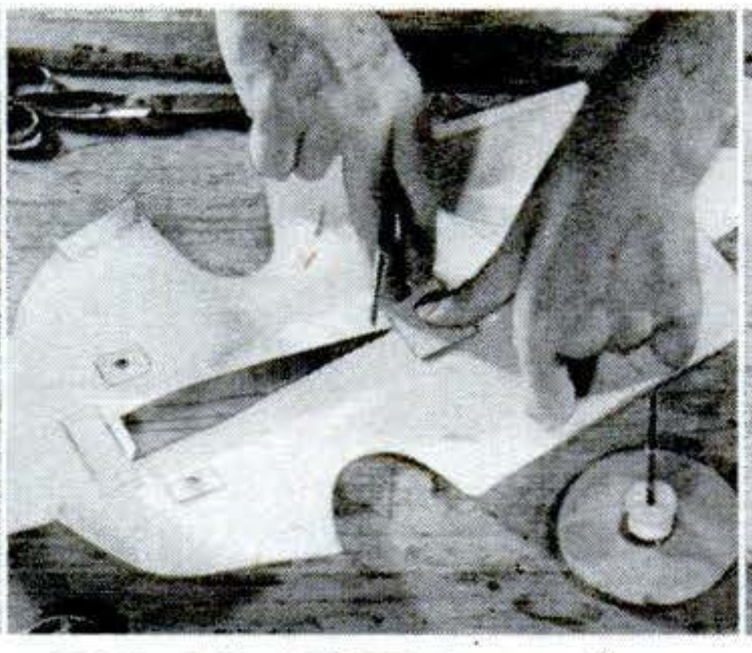


# Sturdy Cardboard Racer Has Rubber-Band Power

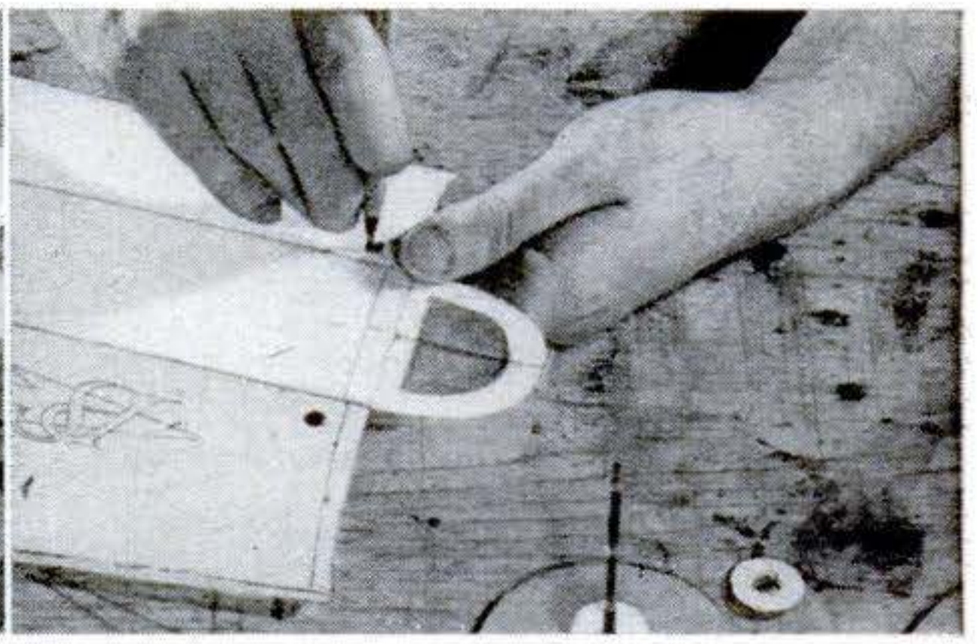
***Though made of cardboard, this last-minute gift will last.***



**CUT OUT BODY** after tracing plan on sheet of three-ply Bristol board. Score gluing flanges for easy bending. Draw in trim and details.



**GLUE ON PATCHES** cut from 1/8" mounting board to strengthen body at critical points and support axles. Apply glue with fine brush.



**PUNCH HOLES FOR AXLES** with sharp pencil or pointed dowel, then rotate soft pencil in hole to rub off graphite for lubrication.

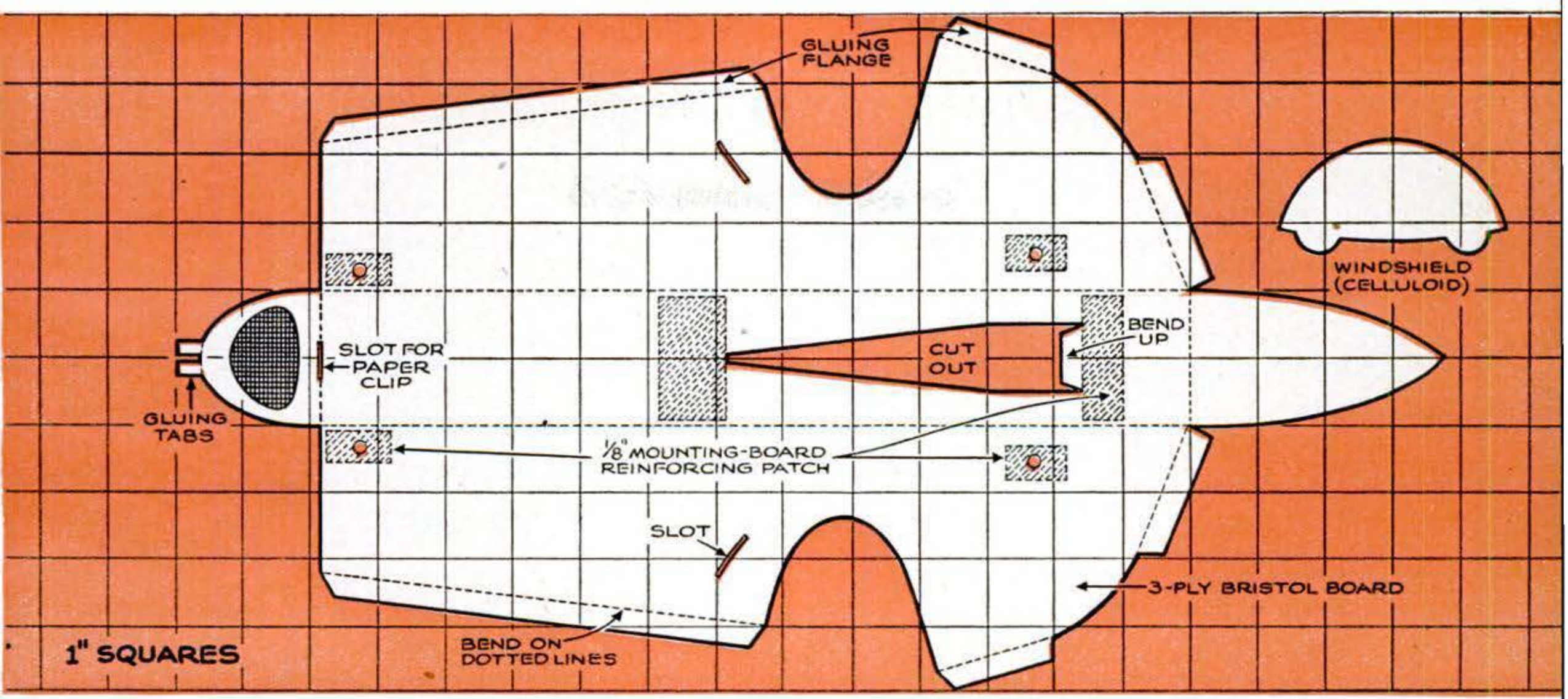
## Foil Foils Paint-Stuck Screw Tops

It is usually difficult to reopen jars containing finishing materials, such as aluminum paint. Dried paint in the threads causes the cap to stick. To eliminate this nuisance, replace the lid with two layers of aluminum foil over the jar mouth.

The foil provides an airtight seal, and when the lid is unscrewed again the slippage between the two layers will let the cap come off easily. Use fresh pieces of foil each time you replace the lid.—*Ken Murray, Colon, Mich.*

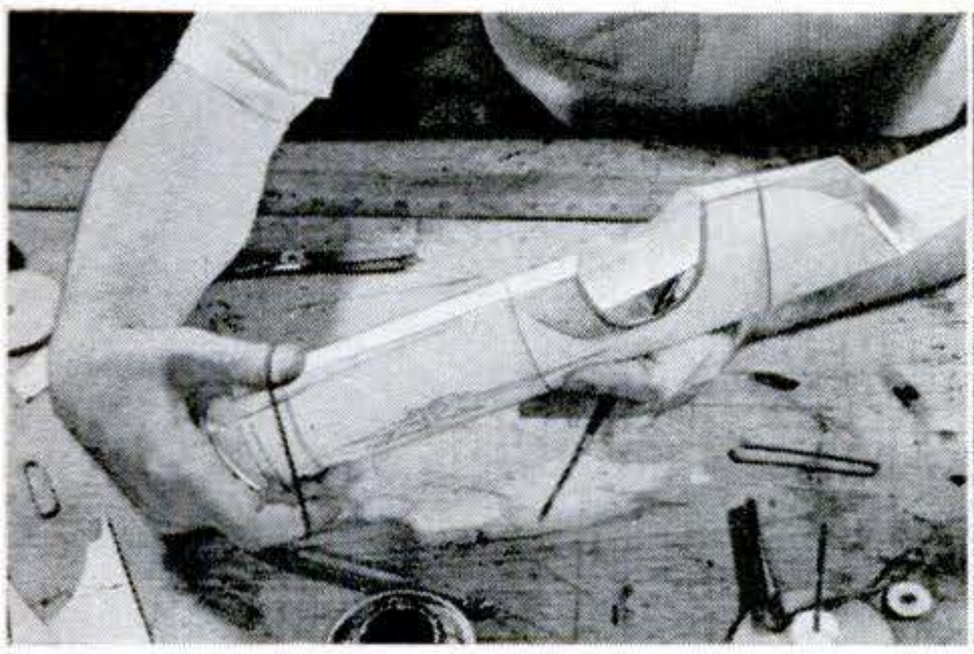


Copyrighted material

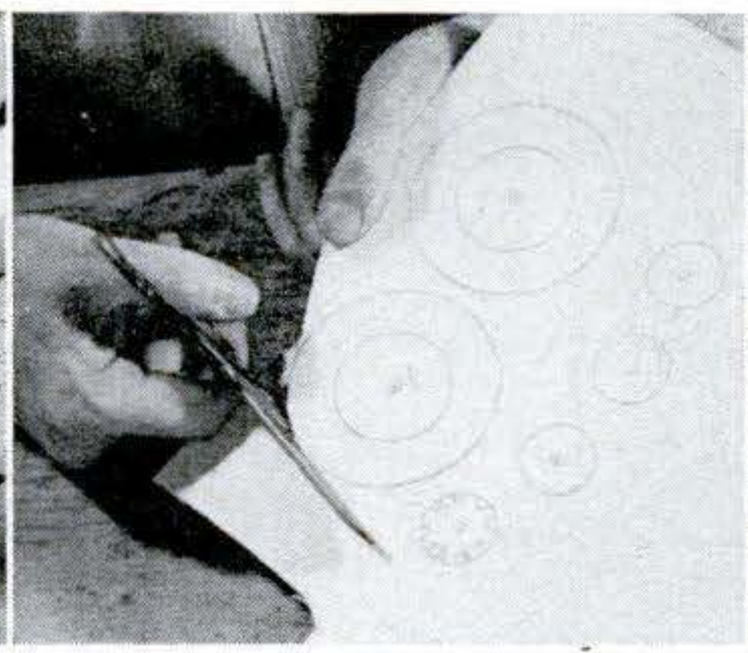



YOU can make one of these Bristol-board racers in less time than it takes to address a batch of Christmas cards. Painted with bright water colors, it makes a fine gift for a small relation. (Two of them are scarcely more trouble than one and permit exciting races in the hall speedway.)

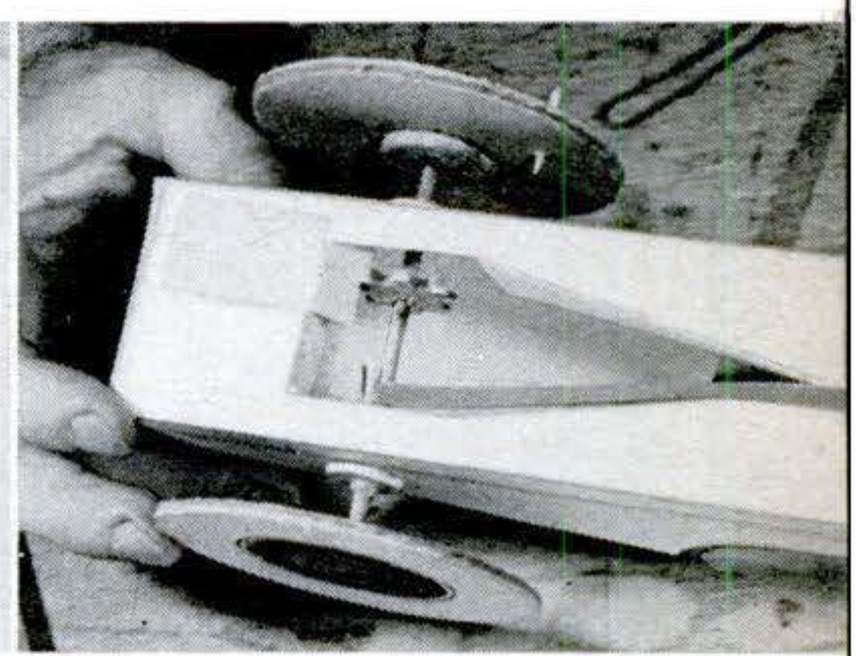
A compass, razor blade and scissors are all the tools you'll need. For materials you'll want a sheet of three-ply Bristol board and some mounting board, both available in artist's-materials stores. Don't be fooled by the cardboard construction—it's strong and rigid.—*Wallis Rigby, NYC.*



**BEND GLUING FLANGES OVER,** apply glue and wrap body in rubber bands to hold it together while glue sets. Tabs on radiator are glued, too.



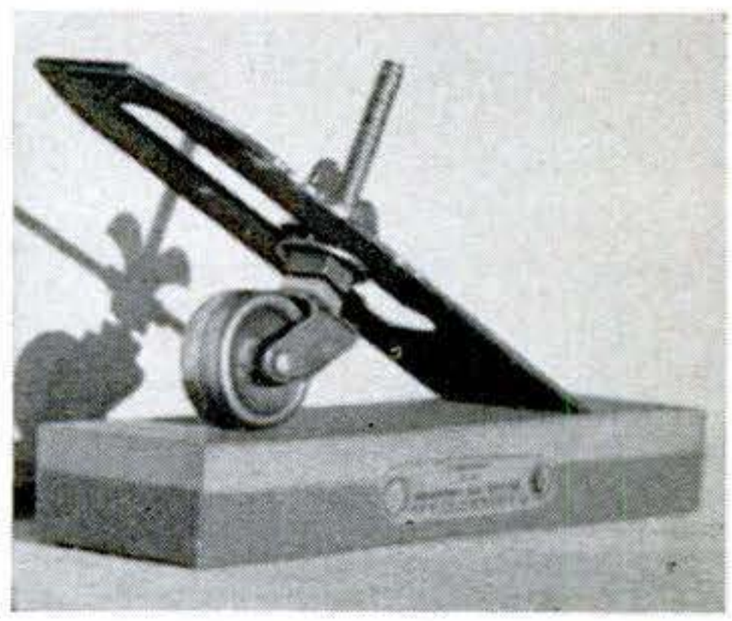
**CUT WHEELS** and axle washers from 1/8" mounting board and punch holes for axles. Axles are 3½" lengths of 1/8" dowel.



**POWER** is supplied by short chain of linked rubber bands. Car is wound up by rotating wheel with toothpick crank.

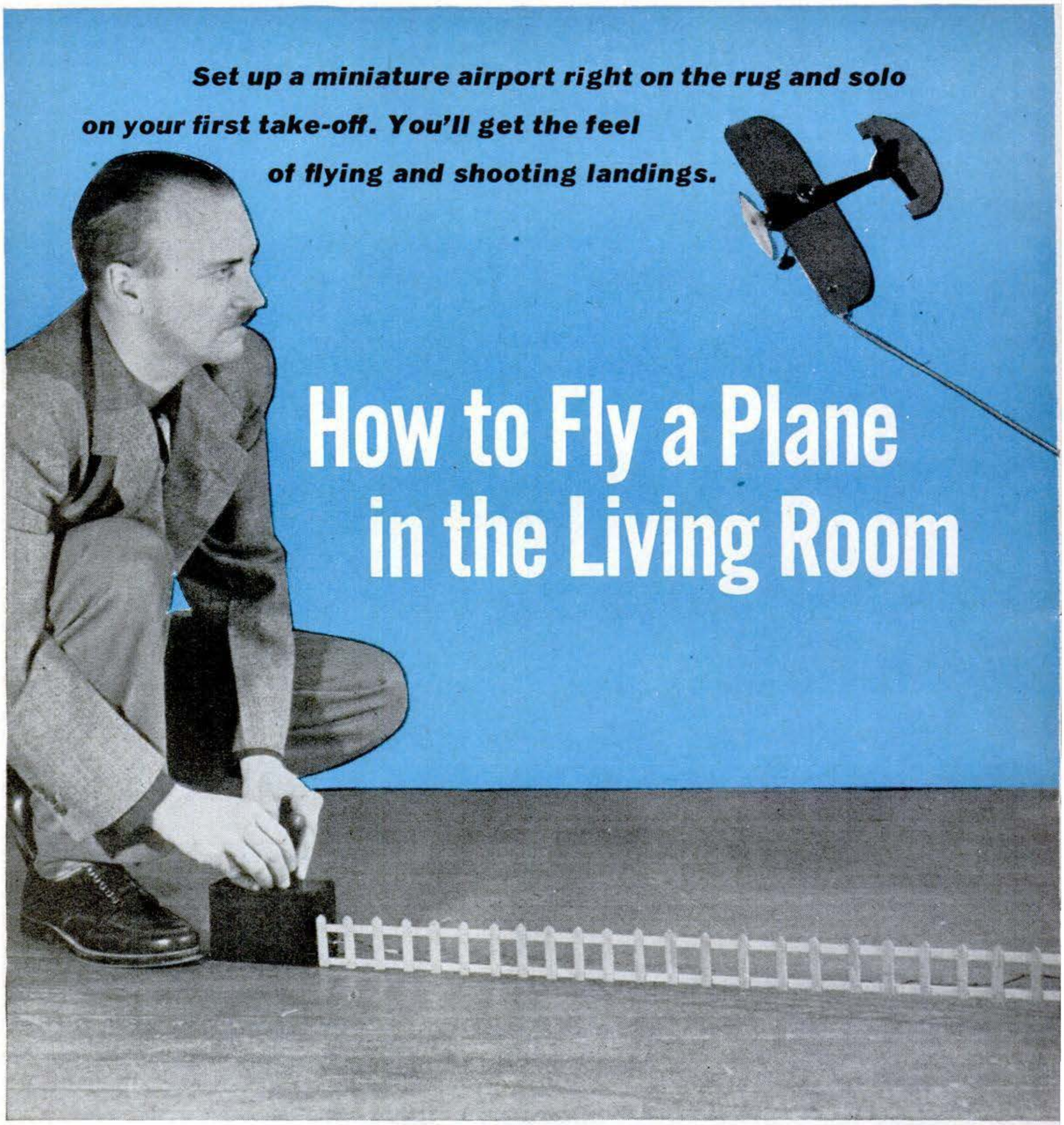
## Plane Irons Sharpened with Rolling Guide

THIS rolling guide assures the proper angle when you are sharpening plane irons. Hacksaw the shank off a caster close to the saddle and punch out the remainder of the shank. Replace the shank with a ¼" by 2½" or 3" stove bolt. Run a nut down the bolt and tighten it against the saddle. A second nut, permitting adjustment of height, two ⅜" washers and a wing nut hold the plane iron at the correct angle on the stone.—*Wallace C. McDermott, Washington, D. C.*





Copyrighted material




THE TIME: A midnight in December.
THE PLACE: Your own airport.
SANTA CLAUS TO TOWER: Flight XMAS approaching Your Town. Over.
TOWER TO SANTA: All clear. Use runway. Watch for new boundary fence. Over.
SANTA TO TOWER: Roger.

The plane buzzes the field once. Then the prop roar dies as the ship settles into an approach glide. It skins over the boundary fence, flares out, and drops to a perfect three-point on the runway.

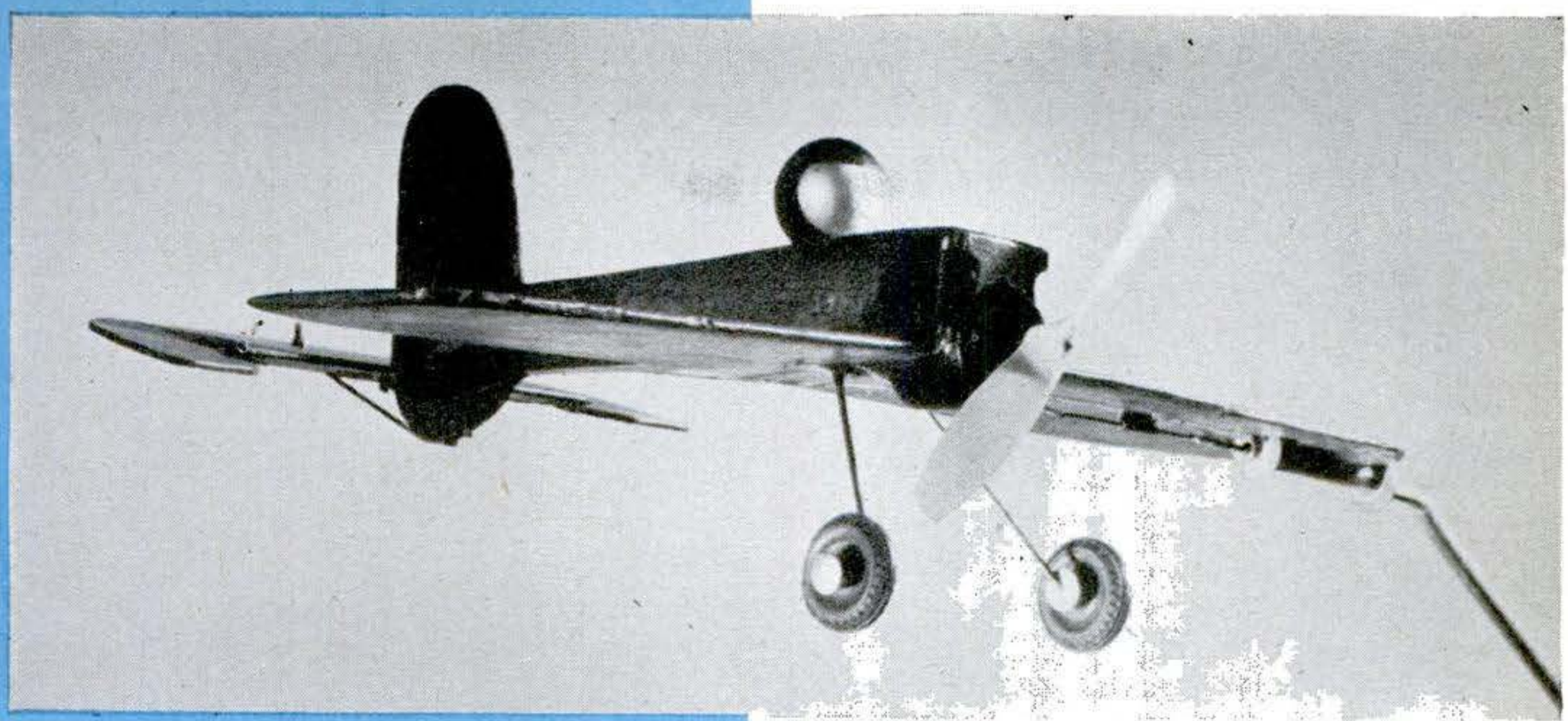
Small feet scurry as the kids scramble for bed so you won't catch them at their Christmas Eve preview. But even if this plane comes as no surprise, you know that young fingers are itching to take the stick.

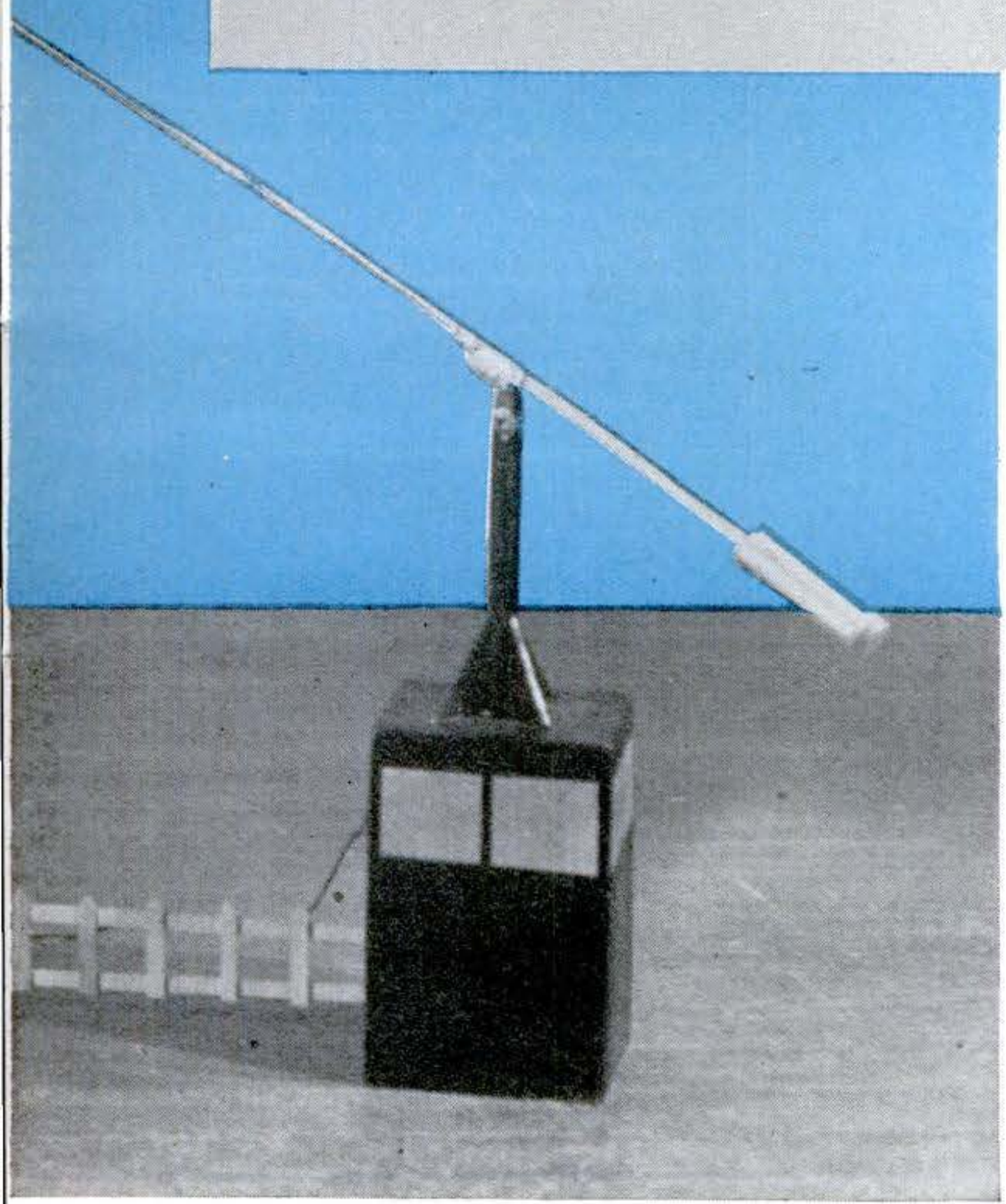
This fast-flying, responsive midget does just about everything a real plane does—takes off, stunts and lands. All you need to build it is an inexpensive battery motor, a curtain rod, a rheostat and a few scraps of wire, wood, tubing and metal.

***Pylon.*** Make the base about 6″ square



Copyrighted material





**PLASTIC-CASED MOTOR, faired into front of fuselage, gives balsa plane plenty of zoom. Note rubber band that pulls elevator down.**

and 8½″ high, of three plywood or cigar-box sides nailed to a top and bottom ¾″ thick. Into the top glue a ½″ dowel with a ¼″ hole through it, with about 1″ projecting.

Cement a 7″ length of ½″ fiber or plastic tubing onto the dowel and brace it with wooden gussets. Solder a washer to one end of a bit of ½″ thin-wall brass tubing as a retainer and slip the tubing into the pylon.

***Swivel arm.*** Bend the pivot bracket from 1/32″ brass and solder to it a piece of 7/16″ tubing that will turn freely in the pylon. Run solder along the seam of a telescoping curtain rod and solder the two sections together into a 39″ length.

File a long opening in the thicker section and solder over it a pulley housing bent from tin-can stock. Center the ¾″-diameter pulley exactly ⅝″ from the pivot pin; this spacing will maintain elevator position at any altitude. Solder a bouillon-cube can to the end of the arm.

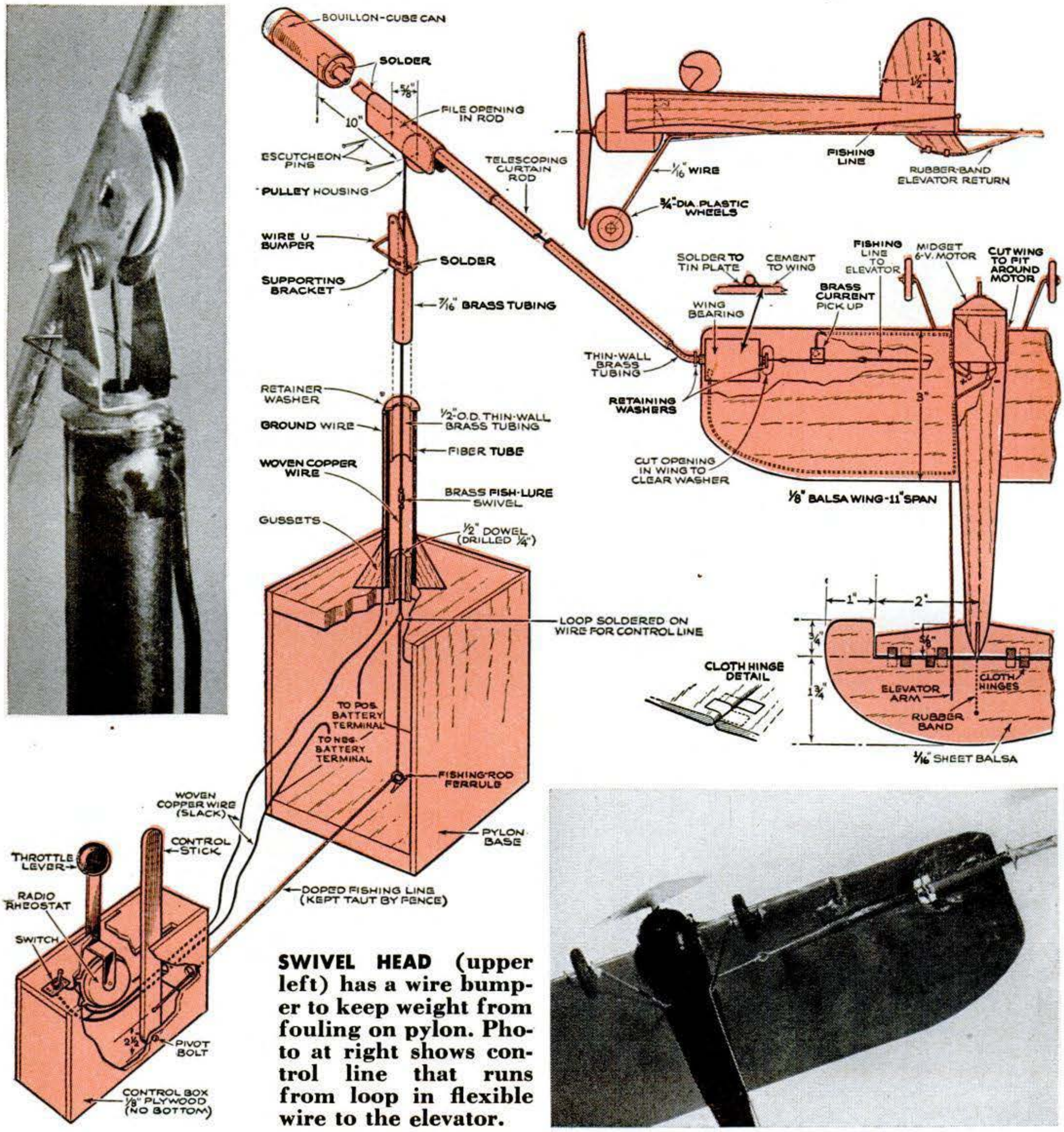
***Wing bearing.*** Solder a few inches of ⅛″ tubing into the small end of the radius arm, bending the tubing so that it will be horizontal when the arm is lowered within 2″ of the floor. Solder the wing bearing, a short tube, to a piece of tin plate. Slide the bearing on the radius arm and solder on washers to hold it.

***Plane.*** A miniature plastic-cased motor forms the nose. Cement a 1/32″ sheet-balsa fuselage to it. Attach the ⅛″-thick one-piece wing to the body at zero incidence. Solder the landing gear to a bit of tin and cement it under the wing. Cement the wing bearing on at a point that will make the plane balance fore and aft. Press a 4″ plastic prop on the motor shaft.

***Control box.*** The throttle is a radio rheostat fitted with a ball-tipped lever. Add an on-off switch if the rheostat has no



Copyrighted material




**SWIVEL HEAD (upper left) has a wire bumper to keep weight from fouling on pylon. Photo at right shows control line that runs from loop in flexible wire to the elevator.**



"off" position. Four flashlight cells in series provide power. One battery lead goes through the rheostat to the pylon bushing, where juice is picked up by the swivel bracket to go through the radius arm. A wire runs from wing bearing to motor.

The control line from the stick is tied to a short flexible wire, and the other battery lead is attached at the same place. Well below the pylon bushing, the flexible wire is soldered to a fish-lure swivel. From the top of this swivel a flexible insulated wire runs through the radius arm, emerging on the wing. It is stripped for 2″ to run through a brass clip cemented to the wing as a current pickup. From the clip a wire runs on over to the second motor terminal.

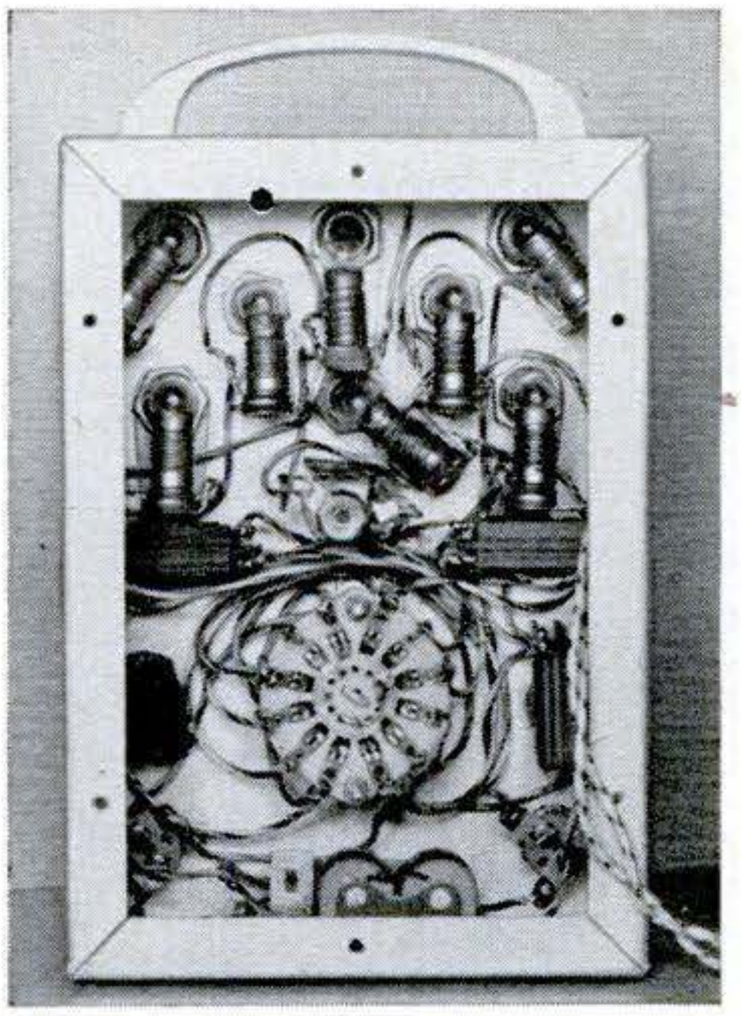
A thread tied to the stripped control wire runs around a landing-gear leg back to the elevator, which has a rubber-band "spring."

***Balancing.*** Fill the bouillon-cube can with washers until it is ¼ oz. shy of balancing the plane. Add cotton to keep the washers from shifting. If the plane is nose- or tail-heavy on the wing bearing, shift the pilot (a 1″ wooden ball) fore or aft.

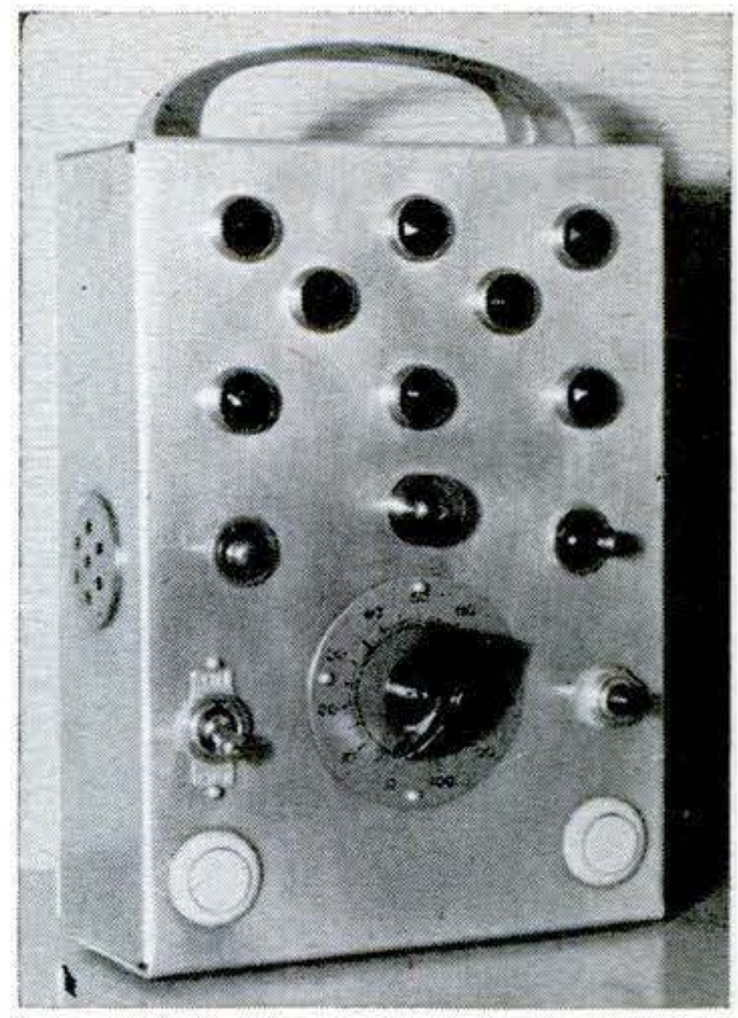
***Fence.*** The control box is spaced from the pylon by the airport fence to keep the control line taut. Make the fence of thin pine pickets glued to a pair of rails. Paint pylon and fuselage black, wing and tail red. —*Roy L. Clough Jr., Bristol, N. H.*



Copyrighted material



## "Do-Nothing" Box Keeps Child Busy



My unpatented Electronic Dingbat has all kinds of switches and buttons that don't do a single thing except light tiny lights and buzz a buzzer. That's enough. For it keeps the junior-grade Edison in our house away from his usual rainy-day occupation—disassembling my electric clock.

A 10-position rotary switch, toggle switches and push buttons permit him to light up a variety of colored lights, either individually or in patterns. An ordinary six-volt buzzer supplies sound effects. A 2″ by 5″ by 7″ radio chassis was used for the box, the back being closed in by a sheet of ⅛″ aluminum screwed to the chassis.

Power is supplied by a six-volt A battery and the pilot light directly over the rotary switch indicates when the box is on.

Two views of the box give the general idea of what to put in it; your scrap box may give you more ideas.—*R. A. Piehl, St. Paul, Minn.*

## Plating Kit Needs No Current

Plating without electricity can be done on a small scale with a new kit. It includes six transparent plastic tanks, a rack to set them up in, and all the chemicals needed to apply four different finishes to copper, brass, iron or steel in less than a minute. Cleaning solution and lacquer are also provided.

The chemicals, which are mixed with water, supply their own electric current and are nontoxic and noninflammable.

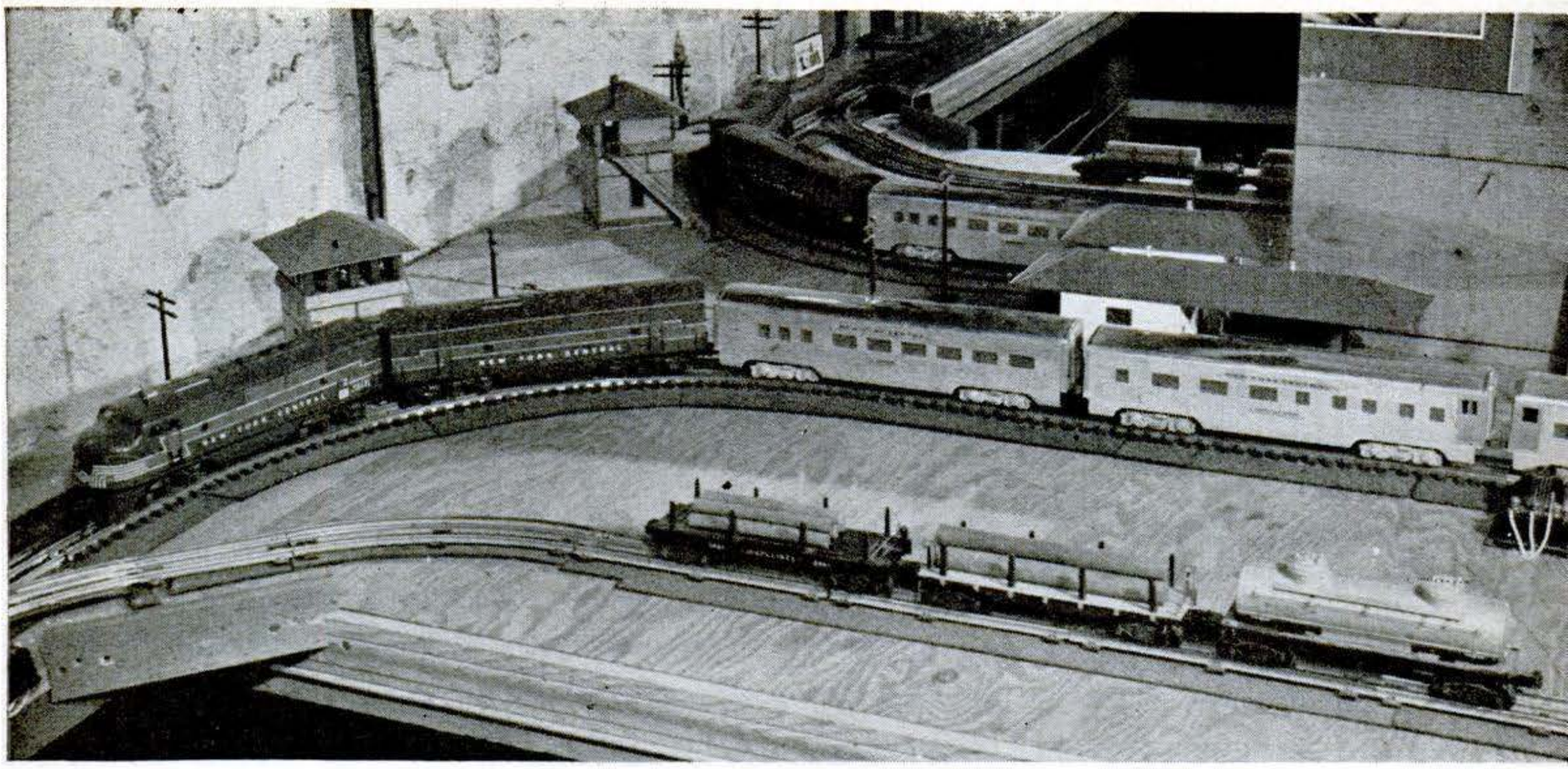
The Easyplater kit sells for $8, and replacement chemicals cost 75 cents for each tank. *Yorktowne Special Products Co., 25 East Broadway, Red Lion, Pa.*

## Records Teach Radio Code

If you are studying for an amateur radio-operator's license, an easy way to learn code is through recordings. Two courses are offered: one with five recordings that is designed to teach up to 7½ words a minute and the other of 11 records to teach up to 18 words a minute. The records are two-side, 78-r.p.m. Fourteen written lessons are included to prepare learners for FCC examinations. *American Electronics Co., 1451 Wilkins Ave., NYC 59.*



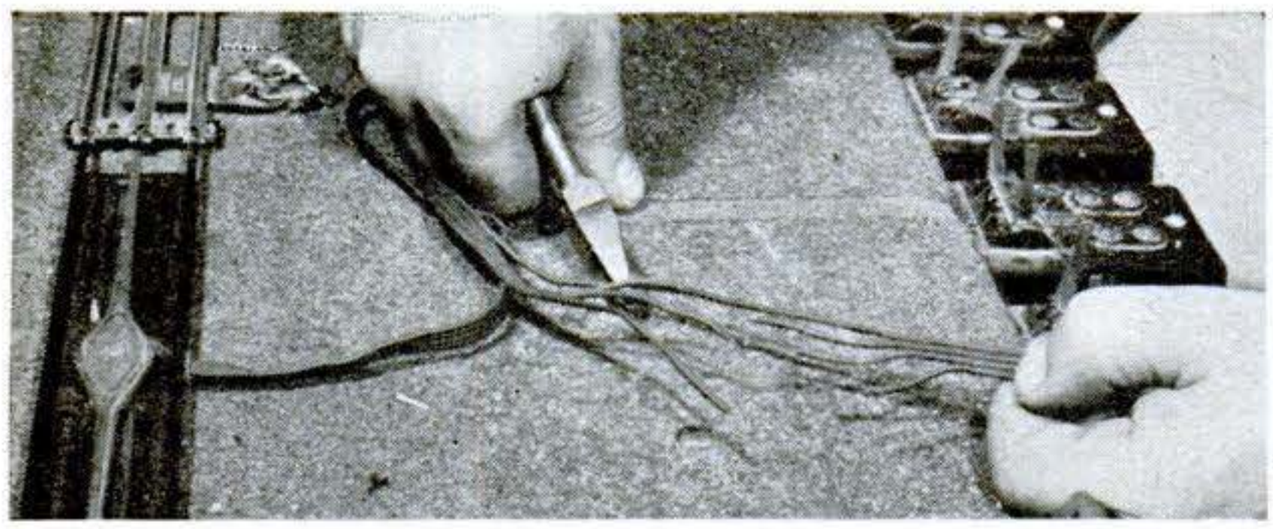
Copyrighted material



# Hints for Model Rail Fans

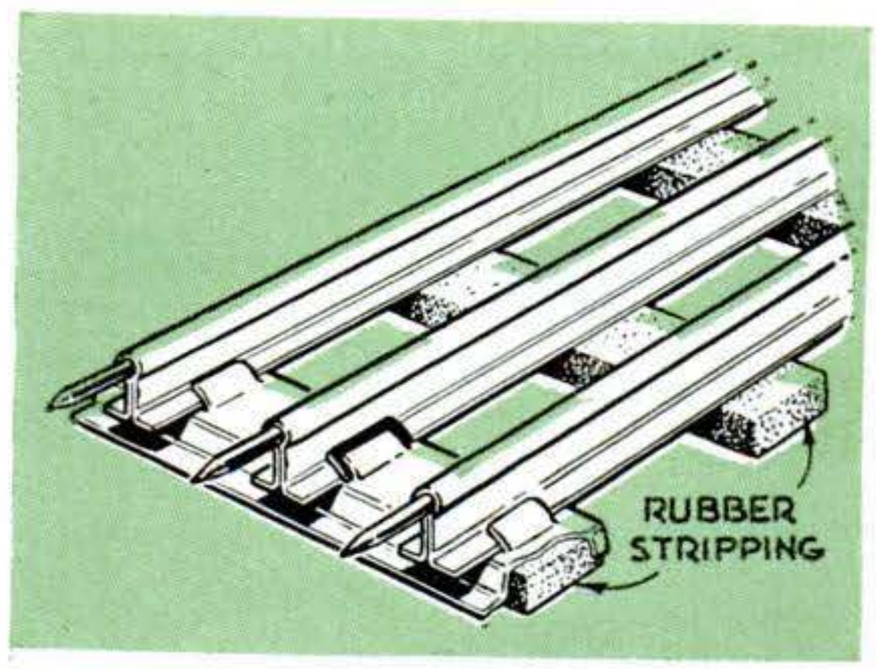
**It's All Done with Mirrors.** Double the size of your pike with a large mirror placed in a strategic corner of the layout. Aside from giving you two of everything for the price of one, the mirror presents an unusual effect as two trains seem to come from opposite directions, hit the curve together and race out of sight. To mirror a long stretch inexpensively, use a couple of ready-made door mirrors mounted on their sides.

**Signal Lenses.** Gelatin prescription capsules—the kind the druggist fills with pink powder for pale people—make perfect lenses for locomotive headlights. Tint with bulb dye for homemade signals.



**Diagonal Cuts Help Key Wires.** Second cousin to a Chinese puzzle is the job of running the four-wire cable under the table from a tinplate operating track to the button controller. The wire is soldered to the terminals at both the track and the controller, making it necessary to unsolder four connections at either end and label them carefully for resoldering.

A much easier and foolproof method is to cut the cable on a sharp diagonal so that after it is run through the hole in the table the short wire on one side is soldered to the long wire on the other side and so on until all four are joined.




**Soundproofing Track.** Sponge-rubber weather stripping, obtainable at auto-supply and hardware stores, makes easy-to-install soundproofing for tinplate roadbed. It comes in several widths and thicknesses, but the ⅛″ by ⅜″ size is best suited to 027 track. Cut it into 2¼″ lengths, strip off the plastic backing and stick it to the underside of the crossties.

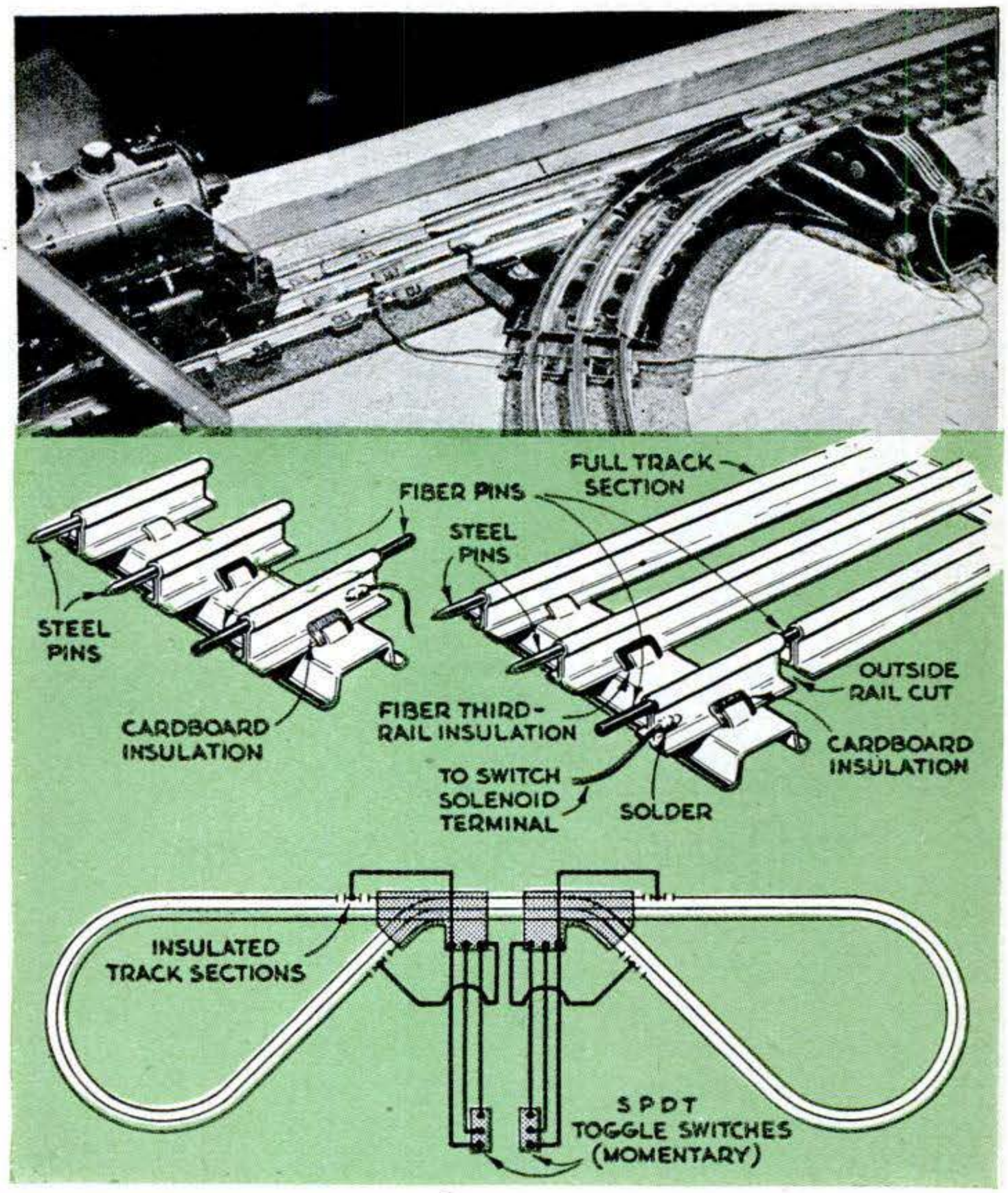
Fill in the spaces between the ties with a few extra lengths of the rubber strip to simulate additional ties for greater realism.



Copyrighted material

**Switches Made Automatic.** You can make your 027 switches automatic, just like the more expensive O-gauge type, by installing short sections of insulated track in front of the incoming legs. Each insulated section throws the switch points over to the proper direction as the first wheels of the train roll over it. The top sketch at far right shows an optional method of insulating a regular track section. Toggle switches are wired in for tower control.

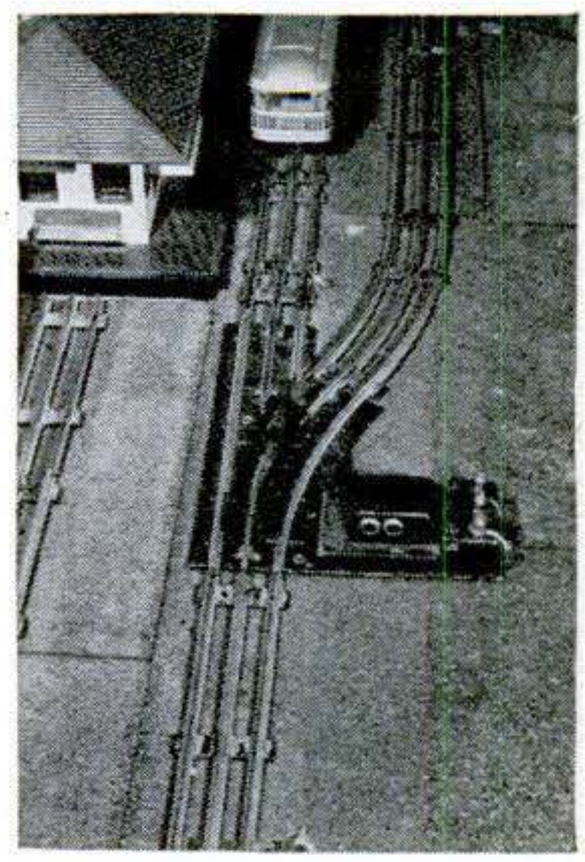
In the point-to-point loop (bottom sketch) the train enters either side of the loop and, as it contacts the insulated track section, throws the switch to leave the loop. Coming back, it enters the loop in the direction that it came out and throws the switch to the opposite direction as it leaves. Such a setup lets a train shuttle over a varied route unattended.



**Crossing-Signal Coat Rack.** This coat rack, made from an old clothes tree, gives an impressive greeting to visitors to your railroad room—and will also make junior trainmen happy to keep their duds hung up. Paint the rack and crossarms white and the lettering black. Screw one clothes hook to the end of each arm. Red trailer lights wired to the track circuit add to the effect.

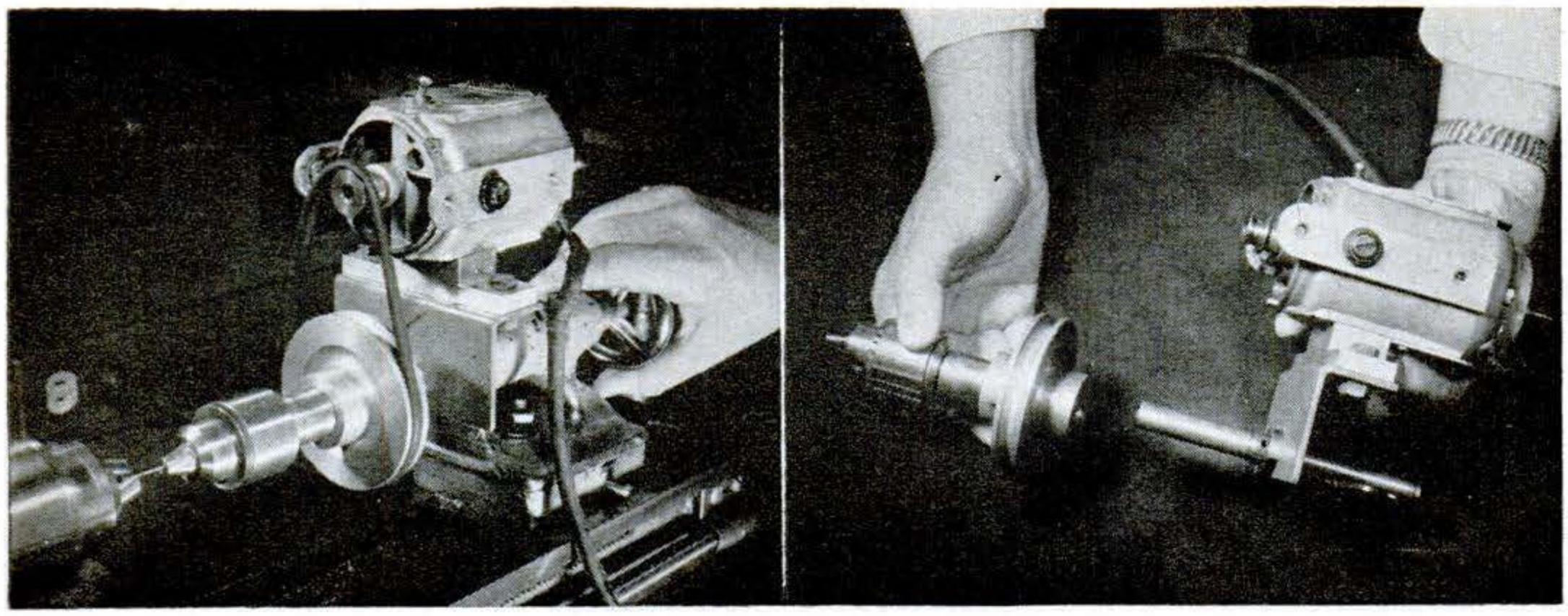
**Traffic for Model Highways.** Shop the toy counter at the dime stores for miniature cars and trucks to add to your pike. Over-all length of an O-gauge auto is 4½″ to 5″, light trucks about 6″, trailer trucks 12″ to 15″. If colors are too gaudy, refinish with model-airplane dope, painting in license plates for an added touch.

**Cut Switches for Tight Trackwork.** Sidings and double main line can be made more realistic by cutting the curved leg off a tinplate switch and replacing it with a matching section of track curving in the opposite direction. Two cut-down switches joined frog to frog give the impression of a complicated slip-switch arrangement and eliminate the exaggerated S curve that results when two regular switches are joined. You can also cut one or several legs off 45° or 90° crossings to make them fit an irregular layout or where several are used together.





Copyrighted material

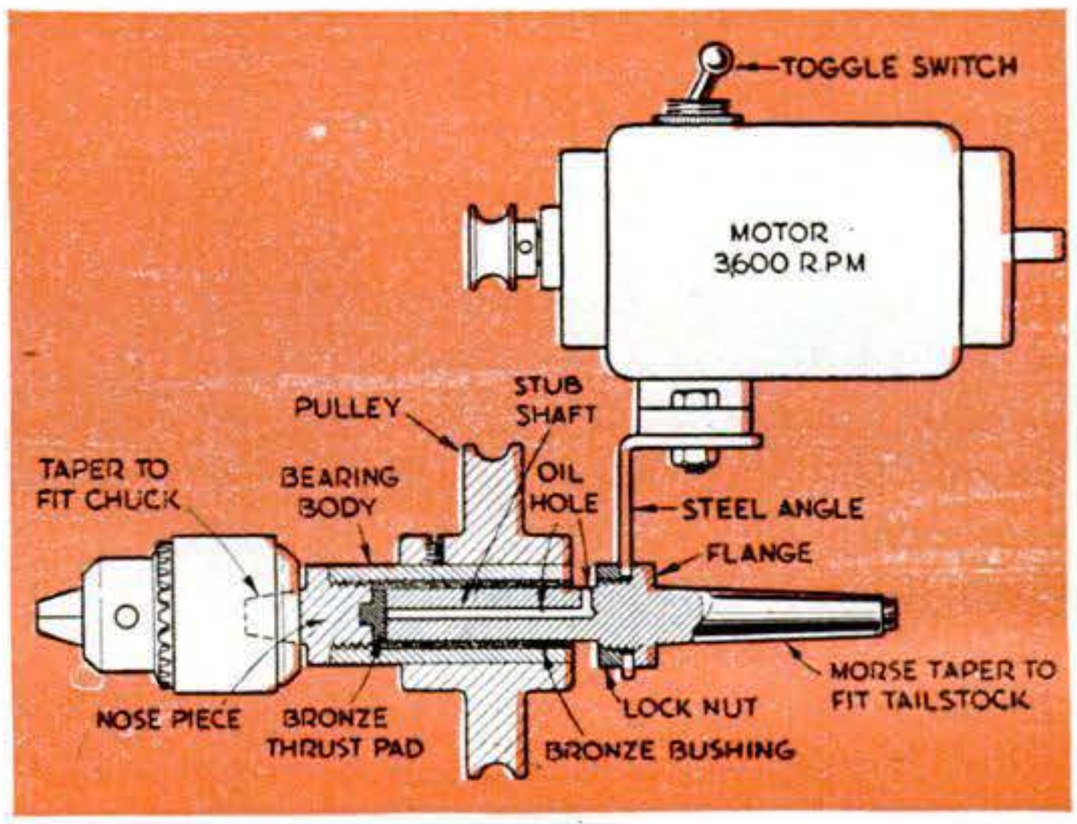


## New Shop Ideas

**Drilling Attachment for Lathe Tailstock.** The high drilling speeds necessary with very small drills cannot be secured on ordinary lathes. This attachment spins the drill at a high rate as it is fed into work revolving in the opposite direction in the headstock. The actual drilling speed is the headstock speed plus that of the attachment.

Turn and thread the stub shaft and taper shank from cold-rolled steel in one operation between centers. Insert it in the tailstock ram to drill the oil hole. Bore out the bearing body to take a bronze bushing; then bore out the bushing to fit the stub shaft. Turn the threaded end of the nosepiece first, drill it for the thrust pad and cut a thread to fit the threaded end of the bearing body. Chuck a piece of scrap brass rod and bore it to take the threaded end of the nosepiece; insert the nosepiece and turn the taper to fit the small Jacobs chuck.

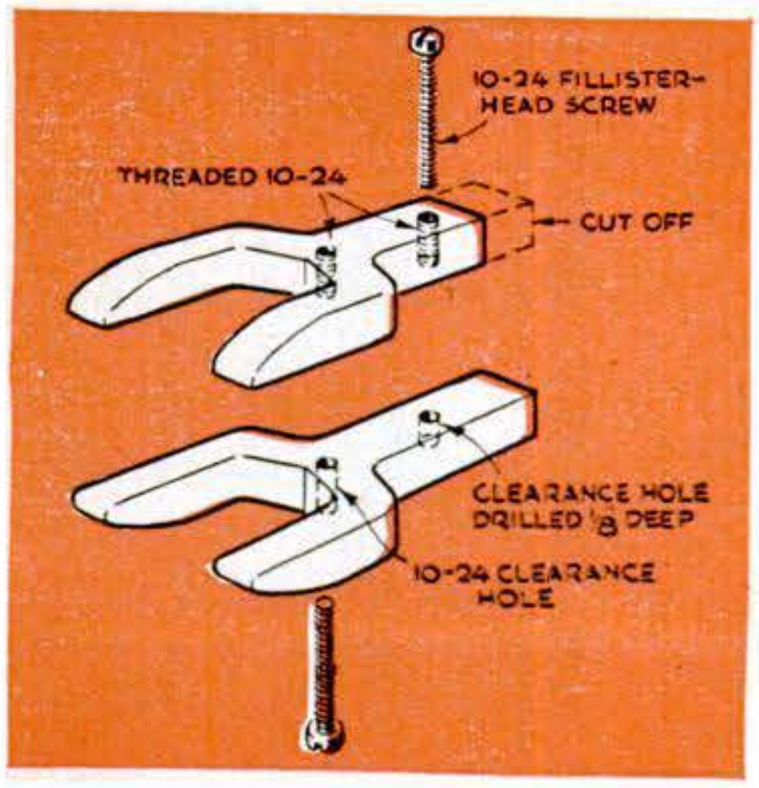
Mount a 3″ pulley on the bearing body, boring it out if necessary to fit. Drill the




steel-angle motor support to fit over the threaded part of the stub shaft and secure it in place with a lock nut.

Bolt the motor (a sewing-machine motor will serve) to the angle, fit the shaft with a sewing-machine pulley and snap a rubber sewing-machine belt over the assembly.

The chuck-and-pulley assembly slides onto the stub shaft, and is held in place while idling by the rubber belt. When drilling, the thrust pad in the nosepiece bears against the end of the stub shaft.—*Dr. W. W. Lacey, Queens Village, N. Y.*




**Four-Fingered Machinist's Clamp.** Superior to the standard machinist's parallel clamp, this one holds the work firmly on *both* sides of the drilling area.

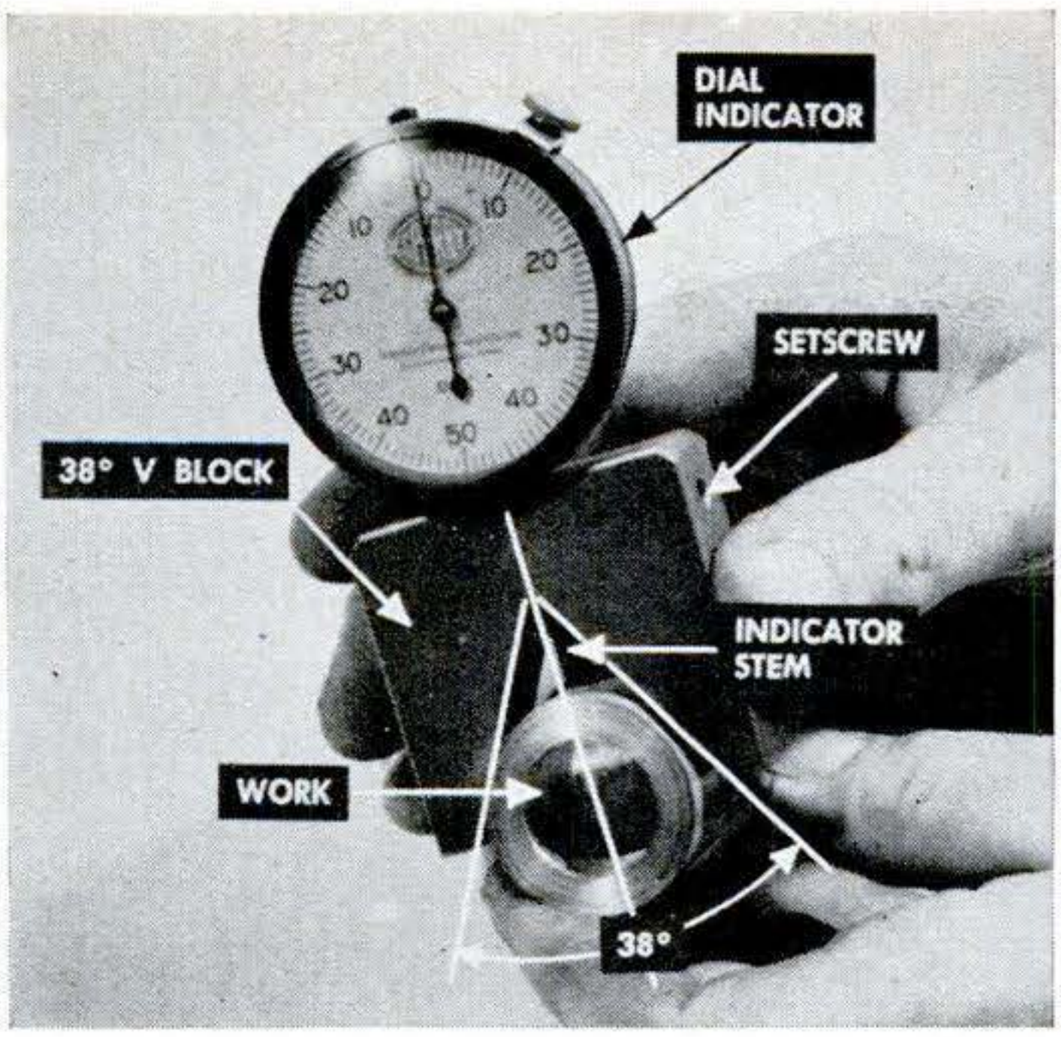
Both parts of the clamp are alike except for the longer shank on the lower one. The same pattern therefore will suffice to cast in bronze as many as you need.

Lacking facilities for casting, the clamps can be cut from ⅜″ flat steel, brass or even dural. The rear adjusting screw sets the clamp to the desired opening and the front screw tightens it on the work.

Work is supported on the drill-press table by a block of scrap wood small enough to fit between the clamp fingers. —*Floyd McGuckin, Ridgewood, N. J.*

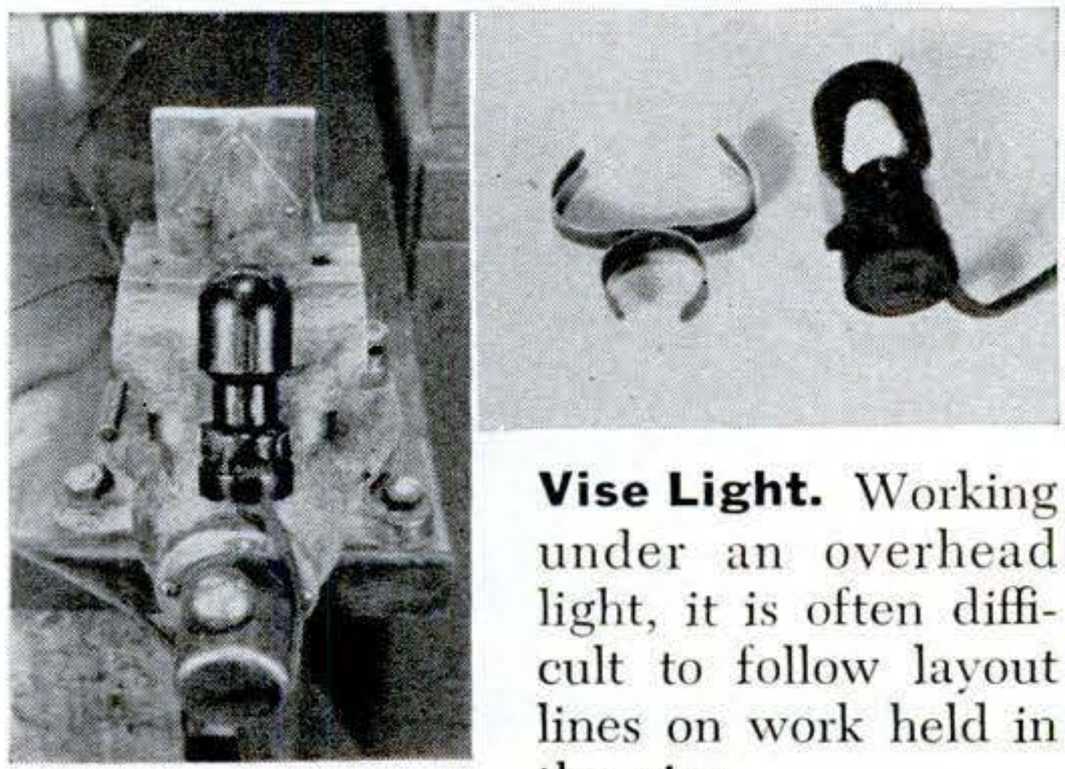


Copyrighted material




**Dial Indicator + V Block = Production Gauge.** A dial indicator set in a special V block becomes an adjustable gauge to show a difference in diameter or an out-of-round of .001″ in duplicate parts. The block is milled to an angle of 38° so that each .001″ on the dial equals .001″ difference in diameter.

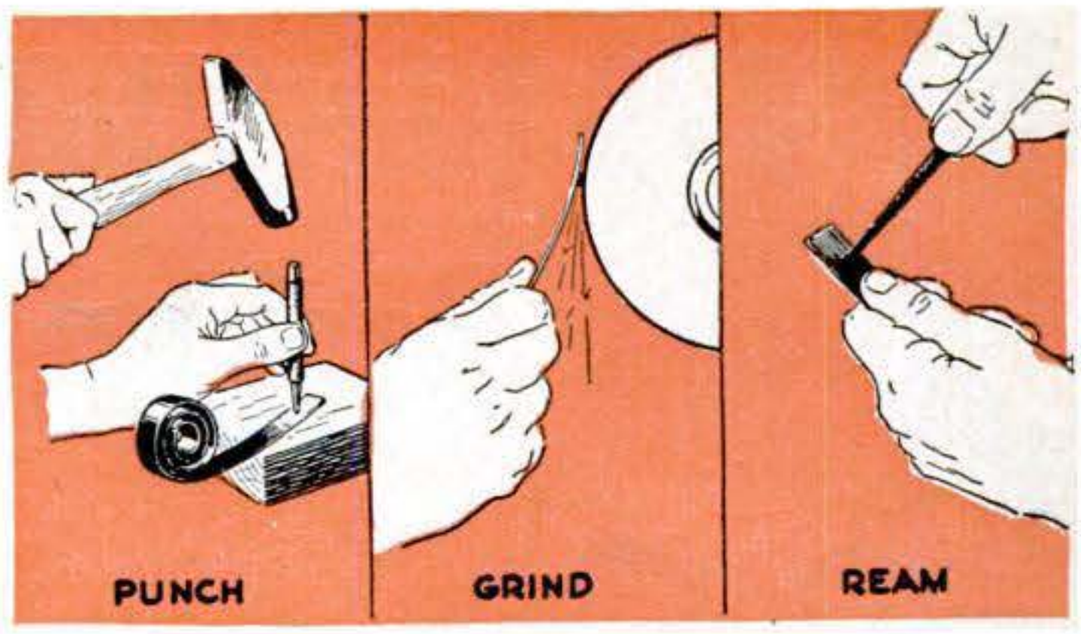
The indicator is inserted in a hole drilled in the center of the V block with the stem touching the sample part. It is then locked with the setscrew and the needle set at zero. If subsequent parts are oversize or undersize, the indicator will read the difference.



**Vise Light.** Working under an overhead light, it is often difficult to follow layout lines on work held in the vise.

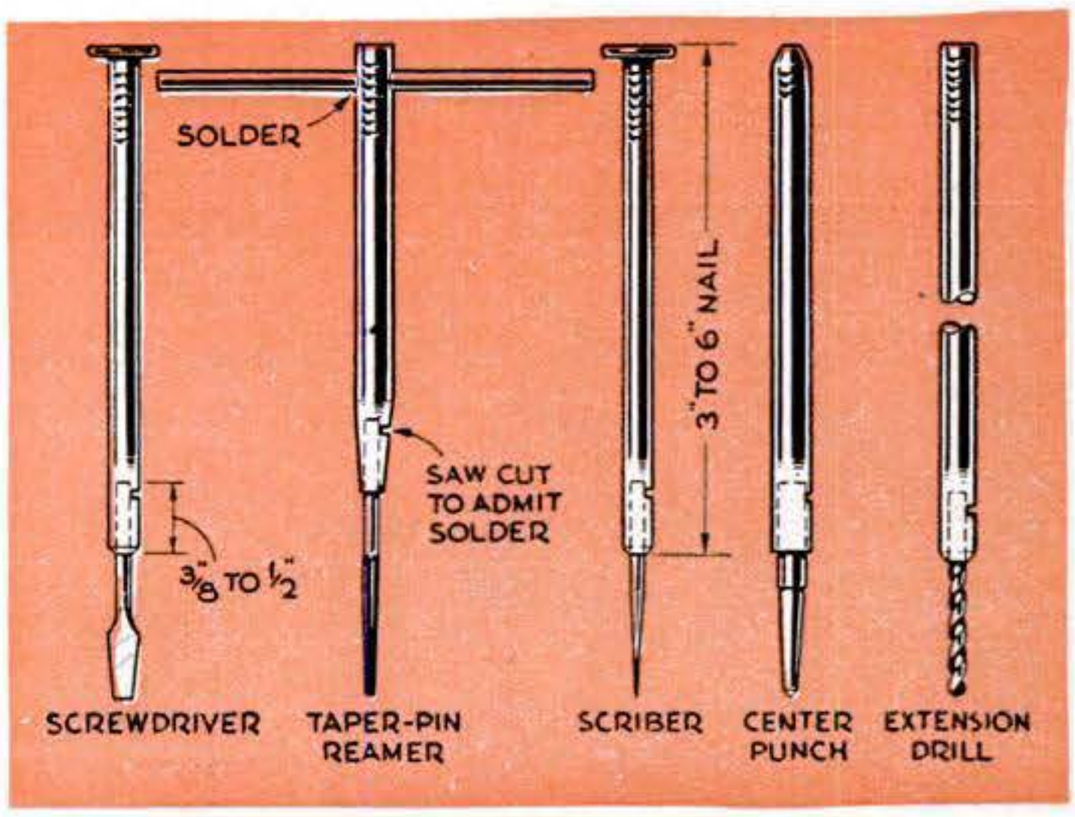
The spring clip shown will enable you to put a small night light on the work. A single rivet holds the two clock-spring clips together, permitting the light to be swiveled to either side of the vise.

The night light may be used as it is if the prongs are covered with electrician's tape. Otherwise cut the prongs off and solder the cord to terminals inside the base.—*Keith Heryford, Cedarville, Calif.*




**Cutting Holes in Spring Steel.** Drilling holes in flat spring steel for mounting screws is next to impossible, and annealing the spring and rehardening it after drilling is a nuisance. Here's a dodge that will save you time and tempering next time you need a hole in a spring.

Place the spring on a block of lead or hardwood and punch a depression in it with a center punch. This will raise a bit of material on the opposite side, which can be ground off to form a small hole. Ream this out to the desired size with the sharp point of a three-cornered scraper or a triangular file, working alternately from both sides—*A. Ferrand, Hawthorne, N. J.*




**Small Hand Tools from Broken Drill Shanks.** Save the shanks from those drills that occasionally get broken around the shop. Soldered into a husky nail (30-penny or larger) they become high-grade hand tools to supplement your tool chest.

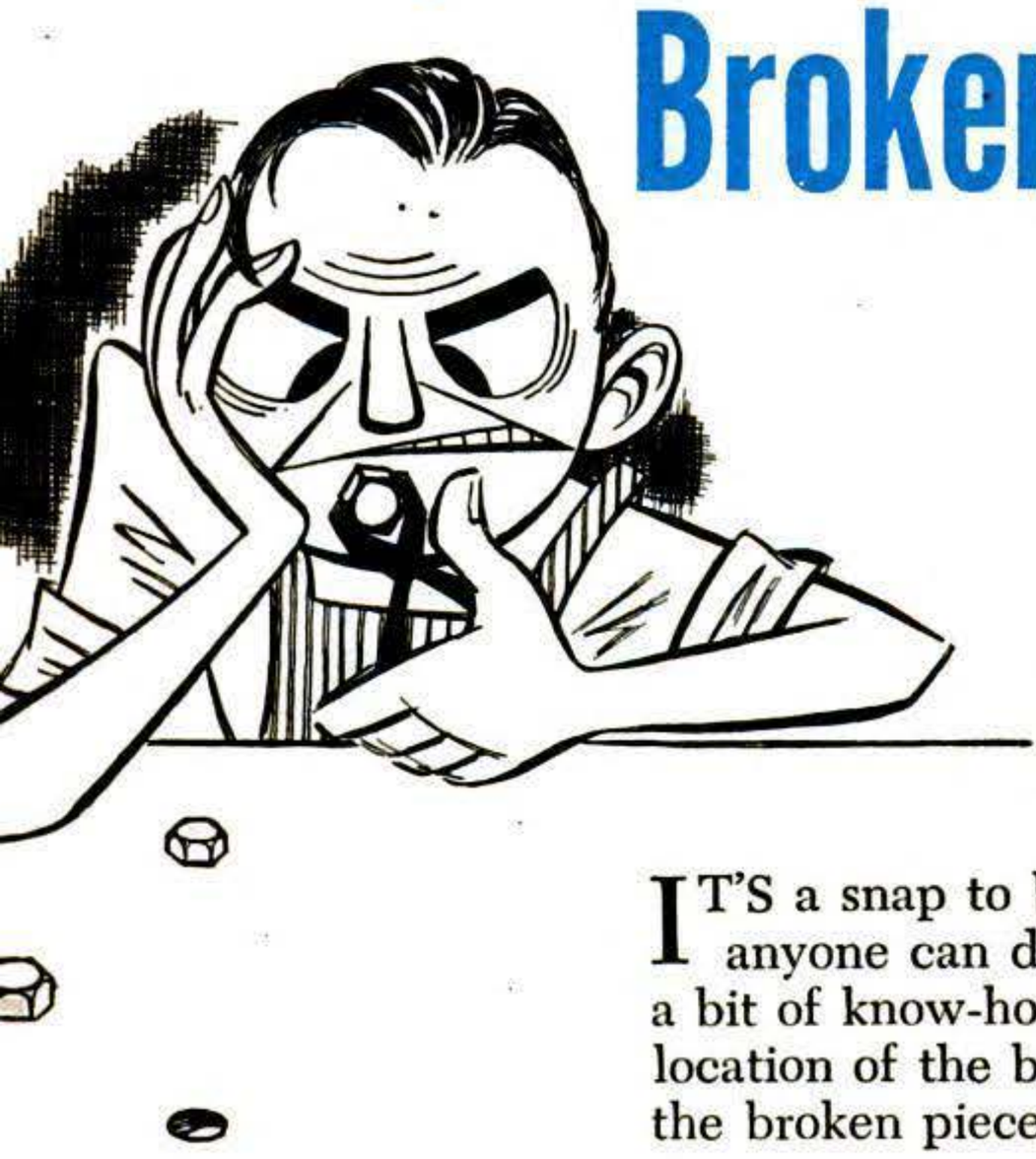
Five examples of drill-shank hand tools are shown above. The hardened-steel shanks can be ground to shape or they can be annealed and filed, then rehardened and tempered. The screwdriver blade was hammered flat before shaping it.

A saw cut in the handle permits solder to flow into the hole to hold the shank securely. —*Edward J. Thatcher, Woodstock, N. Y.*



Copyrighted material

# 6 Ways to Remove Broken Screws and Taps



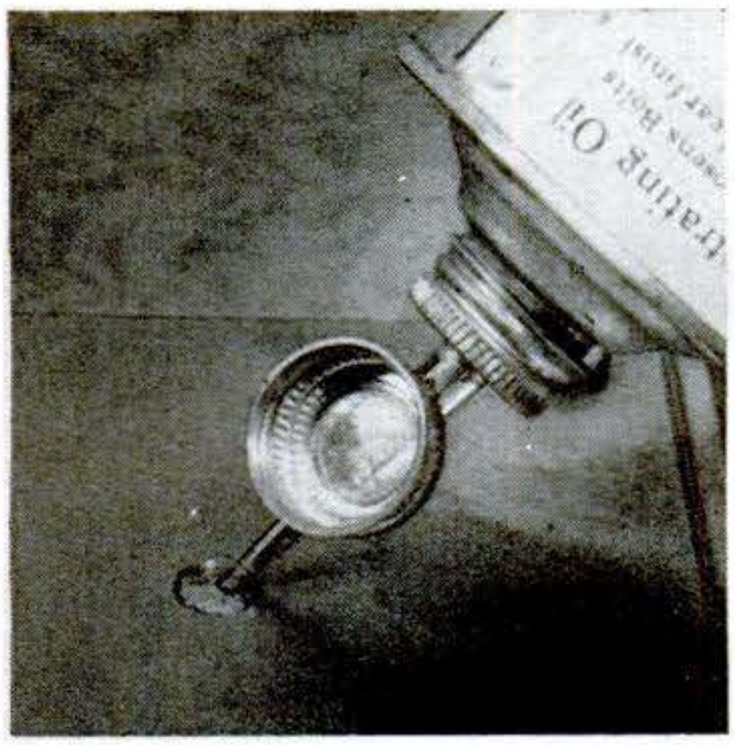
***When any threaded piece breaks off in its hole, you're in a hole, too. Here's how to get out of it.***

**By Will Thomas**

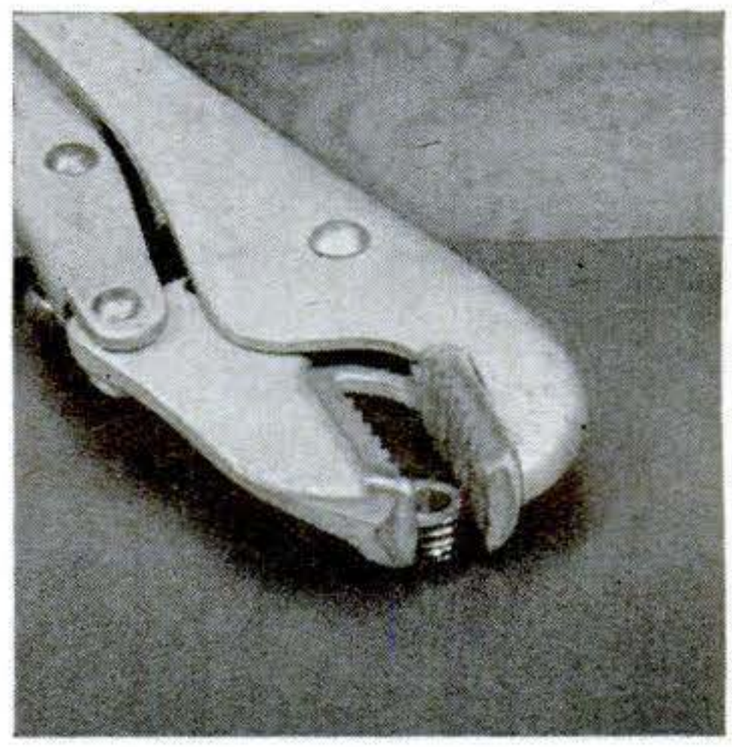
IT'S a snap to break off a screw, stud or tap in a threaded hole—anyone can do it. But getting the stub out of the hole calls for a bit of know-how plus a little luck. Depending on the nature and location of the break, one of the following methods should remove the broken piece. Try them in the order listed.

## 1 Wrench or Screwdriver May Remove Lucky Breaks

If enough of the piece remains above the surface to grip it with a tool, removal with a pair of cam-locking pliers is sometimes possible. But be careful not to chew up the stub into a hard-to-grip taper. If only ⅛″ or so remains, hacksaw a slot in it and see if a husky screwdriver will back it out.



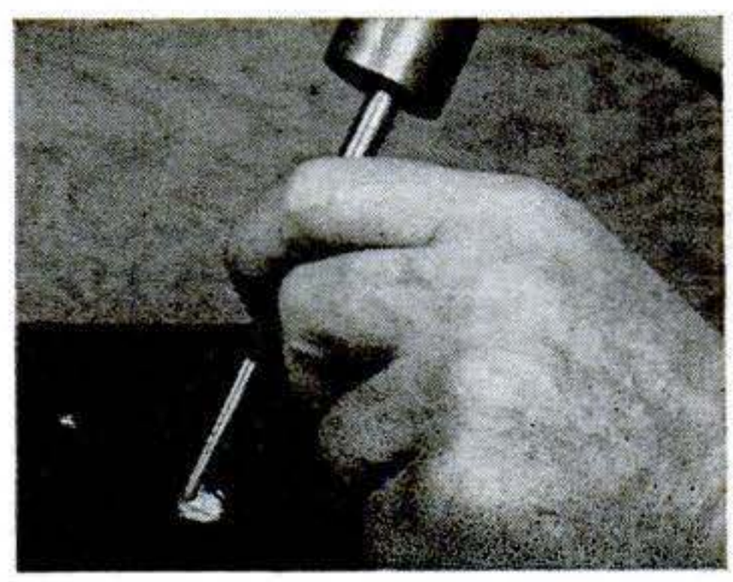
**APPLY PENETRATING OIL regardless of the method used. Allow several minutes for the oil to penetrate as deep as possible. Even if the parts are new, oil will help.**



**CAM-LOCKING PLIERS will take a firm grip on a small part of the broken screw projecting above the surface, enabling you to twist it out with no damage to the hole.**

## 2 Tapping With Center Punch May Loosen It and Work It Out

If the piece is flush or slightly below the surface, flood it with penetrating oil and try drifting it loose with a sharp-pointed center punch struck lightly at about a 45° angle. Continued hammering may expand the piece, adding to your troubles, so if the first few attempts fail to move it, *stop* and try something else.



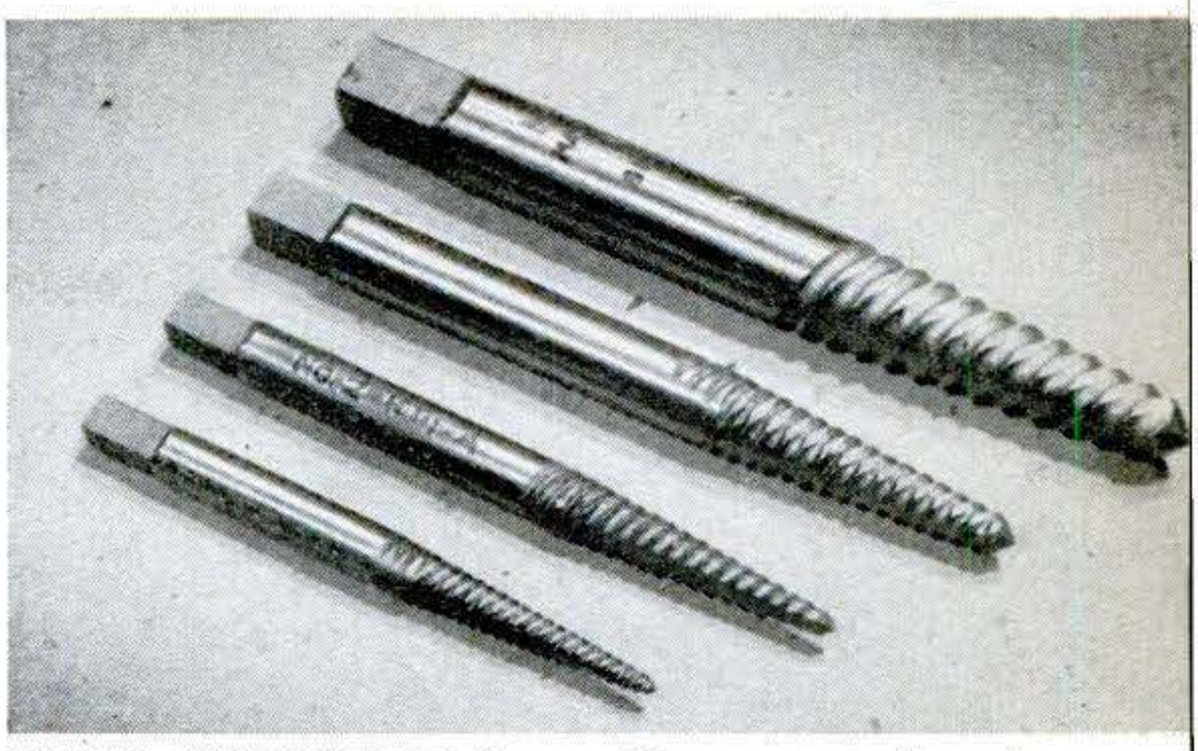
**CENTER PUNCH, tapped lightly with hammer, may jar the screw into rotation. If it does move, proceed gently, making sure that you keep the punch in the same spot.**



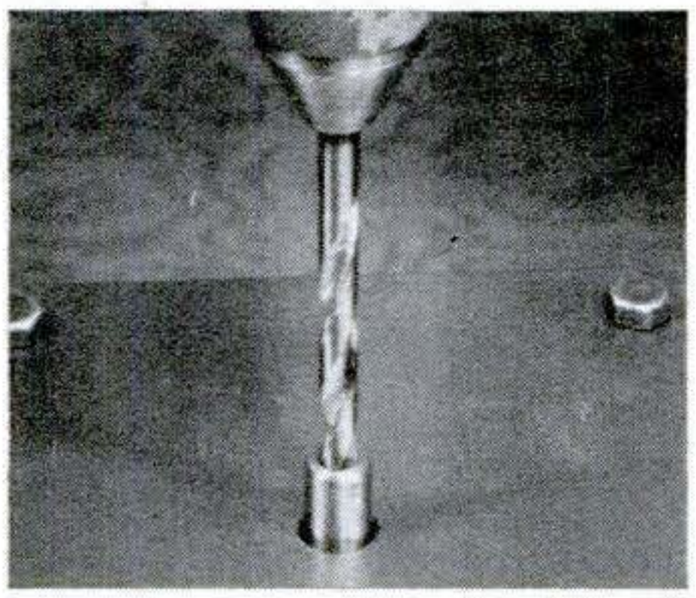
Copyrighted material

## 3 Screw Extractors Are Designed to Do the Job Without Damage

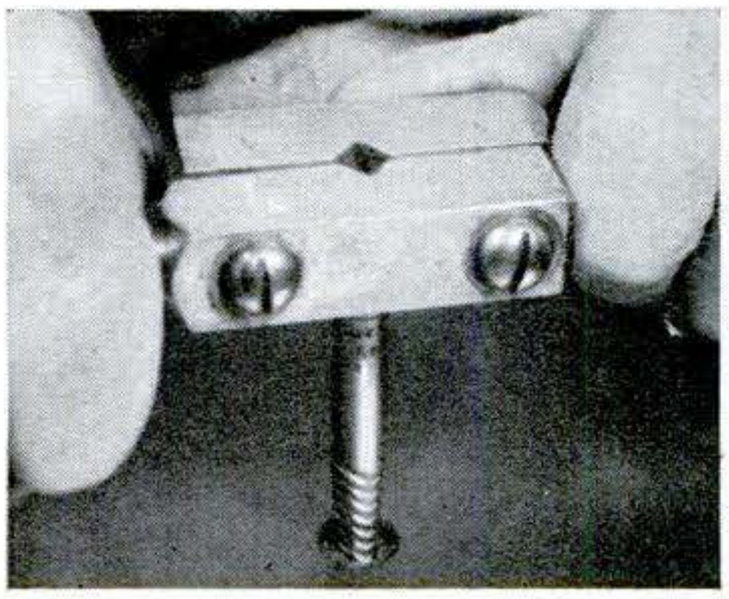
This is the safe way and works in the majority of cases. Screw extractors are available in a range of sizes for removing broken pieces from 3/16″ to 3½″ in diameter. A data card following this article lists these sizes and what to use them for. They are tapered and have spiral flutes running in a counterclockwise direction. Drill a hole in the center of the stub. Wait a few moments for the heat of drilling to dissipate and then drive the extractor into it with light, firm hammer blows. Tighten a tap wrench on the extractor and turn firmly in a counterclockwise direction. If reasonable pressure and plenty of oil will not move the piece, *stop* and use the next method.



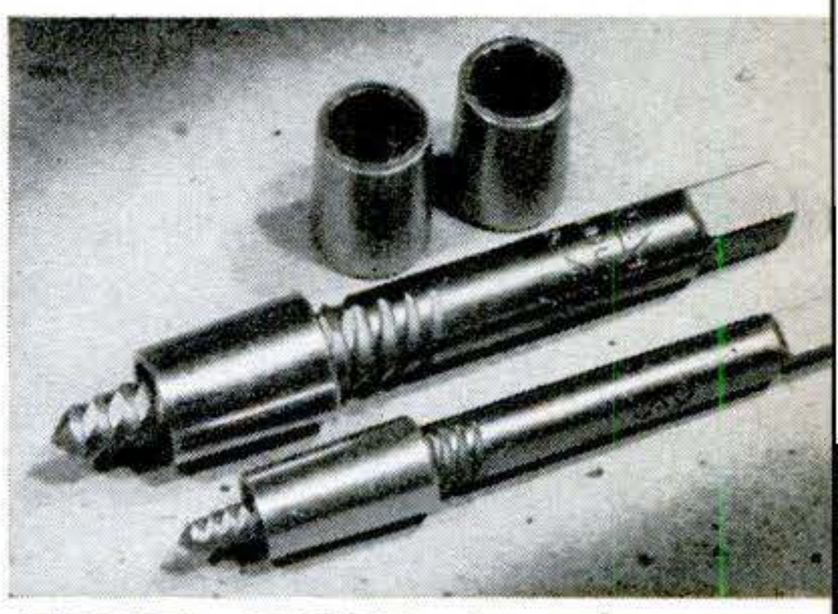
**SCREW EXTRACTORS have flutes running in opposite direction from tap threads for backing pieces out. Some have flattened sides so the flutes form teeth for better bite.**



**DRILL GUIDE assures that hole drilled in broken screw will be centered. Some makers supply these with extractors. They are also simple to turn out in the lathe.**



**A TAP WRENCH, clamped on square shank of extractor after it has been driven into hole, is used to twist screw out. Avoid single-handled wrench —it may break extractor.**



**TAPERED COLLARS, forced on extractors, are used by some mechanics to prevent extractor from being driven in so deep that it expands top of piece, jamming it tighter.**

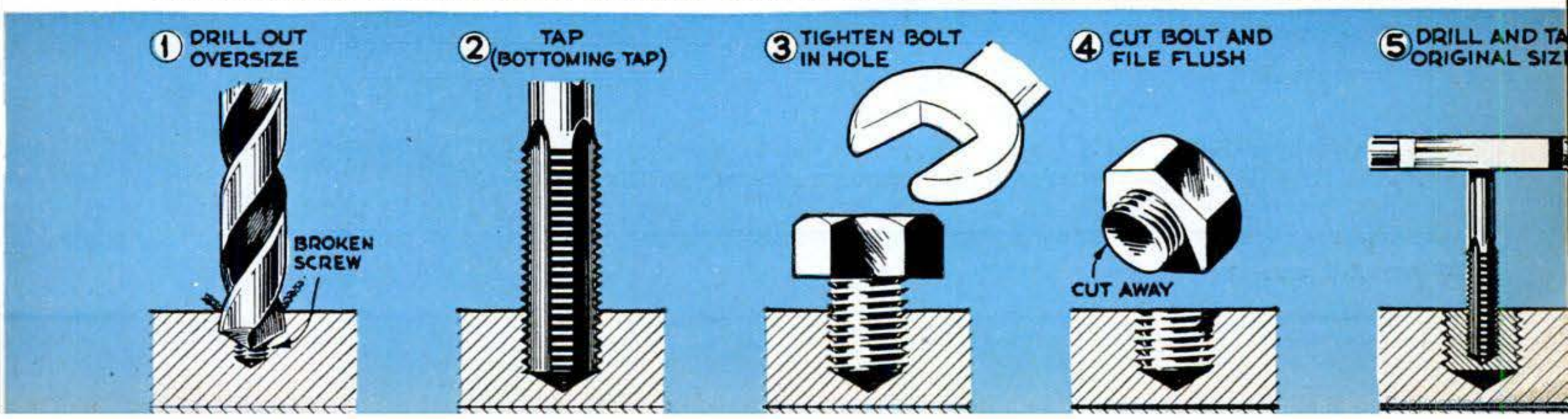
**ALLEN SCREWS with sockets so worn that Allen wrench will not turn them can be removed with screw extractor. Grind off point of extractor so flutes will grip shallow hole.**

## 4 Drilling the Piece Out Will Permit Retapping the Hole

For stubborn cases and for broken-off screws smaller than 3/16″ you may have to use this method. Center-punch the piece and drill it out with the size drill used for drilling the tapping hole for that screw. Then retap the drilled-out hole with a bottoming tap, taking care to enter the original threads. This should clean out the threads, but if they are damaged, you'll have to drill and tap the hole for the next larger size screw. If the screw *must* be the same size, drill and tap the hole oversize and fill it with a large plug. The plug is then filed flush with the work and drilled and tapped for the original screw.

***Please turn the page.***

**Oversize plug, threaded into damaged hole, is drilled and tapped for original thread size.**

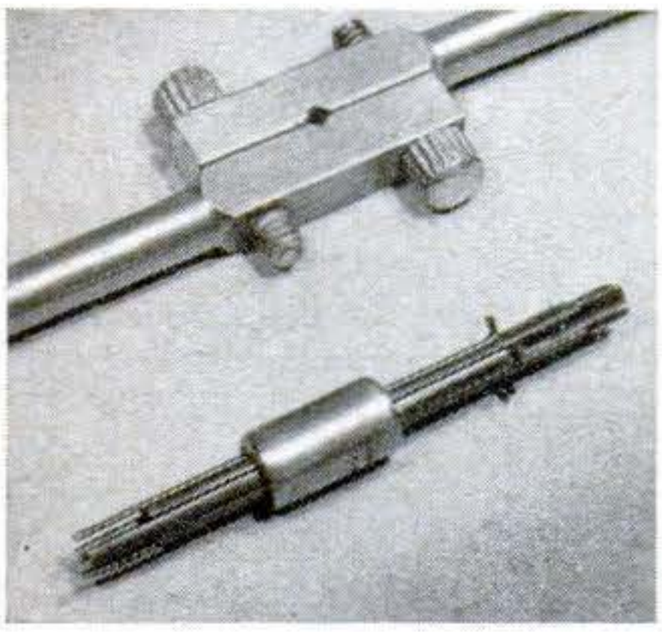


## 5 Tap Extractors Are Specialized Tools for a Tough Job

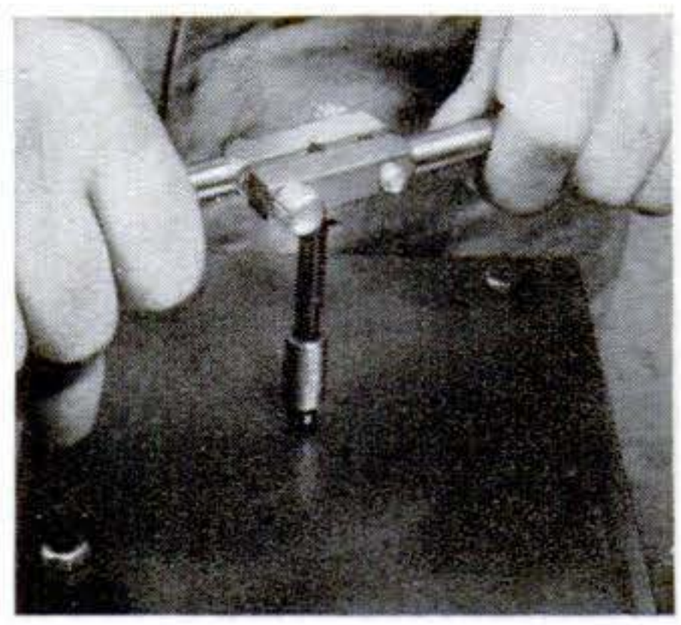
Threading taps, being hardened, will not respond to the screw-extractor or drilling-out methods. Occasionally, if the broken tap is not lodged too tightly, it can be drifted out by the center-punch method, but generally a tap extractor is a must. They are made in the same sizes as the taps and you need an extractor for each tap size.

Insert the prongs down into the flutes of the tap and press the collar down as far as possible. Clamp a tap wrench on the square shank of the extractor and turn with reasonable pressure in a counterclockwise direction.

If several attempts bring no results, *stop* and try the last resort.



**TAP EXTRACTOR** has sliding prongs that slip down between flutes of broken tap. Collar is pressed down so that it will hold prongs snug.



**TAP WRENCH** is used to turn tap extractor in same manner as screw extractor. Extra caution is advised as tap extractor is delicate and easily broken by too much force.

## 6 Break It Up or Grind It Out as Your Last Resort

This is your last chance and at this point it pays not to worry too much about the work—if you chew it up a bit, you can always thread in a large plug and then drill that for the original thread. Using slender cold chisels and punches first, try to break up the piece and remove it a bit at a time. Failing this, grind the piece away with an abrasive wheel slightly smaller than the hole. Mount the wheel in an electric drill and go light on the pressure or you'll chew up a lot of wheels.

**GRINDING WHEEL,** driven by electric drill, will grind tap stub away when all else fails. When stub is ground away, drill hole oversize for plug as previously outlined.

### SCREW-EXTRACTOR SIZES

Screw extractors are made in numbered sizes to remove screws in the size ranges listed at right. Use the proper drill for each extractor. Drive the extractor into the hole until the flutes bite into the metal. Then clamp a two-handled tap wrench on the square shank of the extractor and turn firmly in counterclockwise direction.

| *Extractor No.* | *For Screw Sizes* | *For Pipe Sizes* | *Drill Size* |
|---|---|---|---|
| 1 | 3/16" to ¼" | | 5/64" |
| 2 | ¼" to 5/16" | | 7/64" |
| 3 | 5/16" 7/16" | | 5/32" |
| 4 | 7/16" to 9/16" | | ¼" |
| 5 | 9/16" to ¾" | ⅛", ¼" | 17/64" |
| 6 | ¾" to 1" | ⅜" | 13/32" |
| 7 | 1" to 1⅜" | ½" | 17/32" |
| 8 | 1⅜" to 1¾" | ¾" | 13/16" |
| 9 | 1¾" to 2⅛" | 1" | 1 1/16" |
| 10 | 2⅛" to 2½" | | 1 5/16" |
| 11 | 2½" to 3" | | 1 9/16" |
| 12 | 3" to 3½" | | 1 15/16" |

FOR YOUR *POPULAR SCIENCE MONTHLY* INFORMATION FILE



Copyrighted material

# PATTERN FOR PERFECTION...

The best of materials, strict standards of workmanship, the finest tools—this is the real mechanic's pattern for perfection. Naturally, you, as a real mechanic, quickly recognize the work of others who measure accomplishment by the same standards.

Bonney wrenches fit this pattern of perfection. That is why mechanics call them America's finest—unmatched for lightness, strength, balance, and precision.

Bonney wrenches are the pride of the men who make them . . . the pride of the men who use them.

BONNEY FORGE & TOOL WORKS
Allentown, Pennsylvania

BONNEY TOOLS

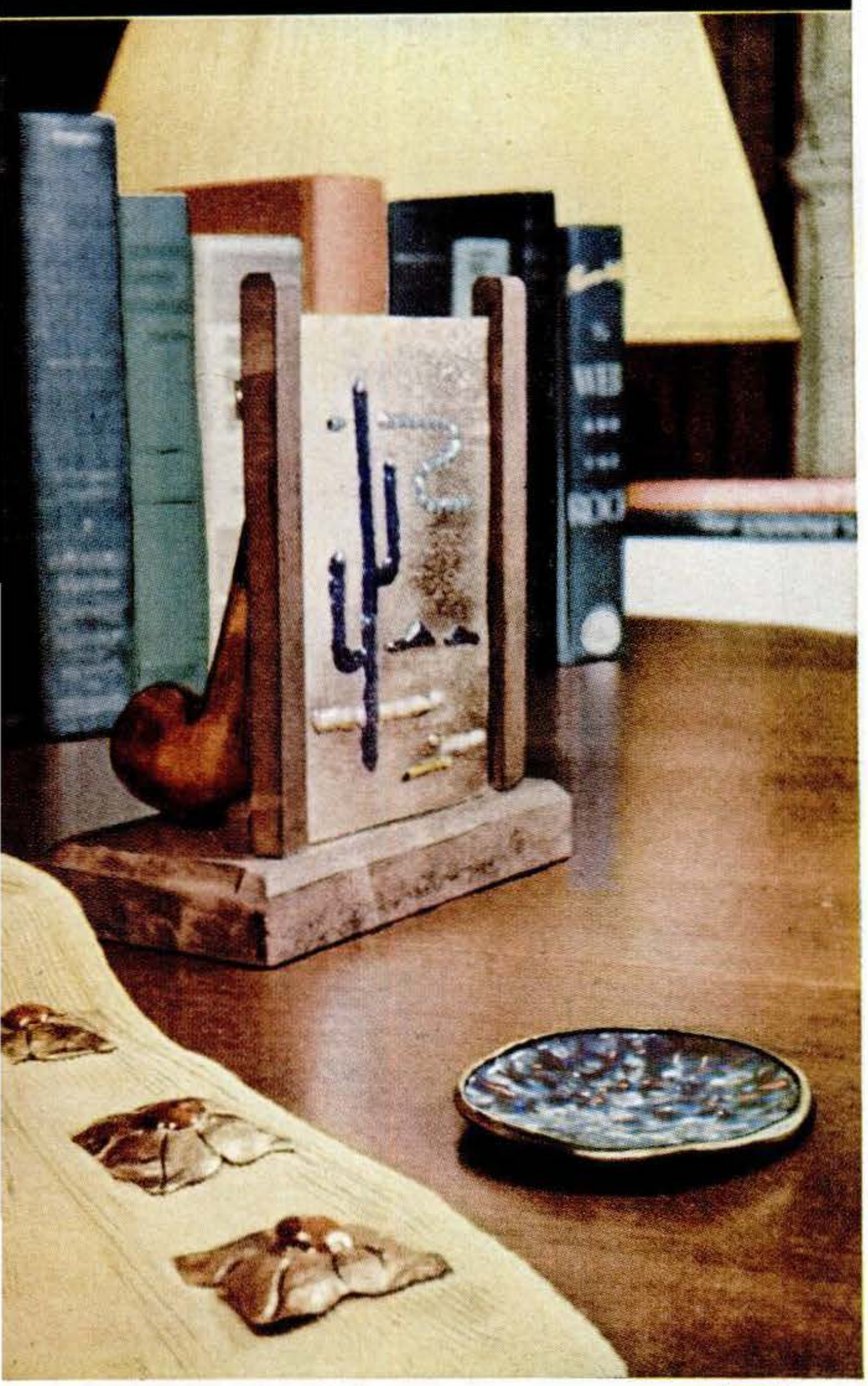
The skilled mechanic whose constant concern is with this pattern for perfection is exemplified in the men who produce the versatile tractors made by Buda, Case, Allis-Chalmers, Caterpillar, John Deere, Minneapolis-Moline, Oliver, and others.

# Glazing with Glass Beads

**GLASS BEADS** are arranged in designs on adhesive that holds them in place during firing. Beads will fuse into solid masses of brilliant color.

**DESIGNS** can be laid out on metal first or "painted" in freehand as above, using tiny brush dipped in adhesive to pick up the beads.

**FIRING** takes only few minutes. After slow cooling, clean off oxide with 30-percent nitric acid, then polish and coat with clear lacquer.



**COLORFUL GLAZES** decorate many ornamental objects. Pipe rack has striking desert scene glazed on metal back. Jewelry pins were made by heaping beads in center of metal leaf designs so they fuse into globs.

**GLAZED ASH TRAYS** are handsome as well as useful. One at right has pattern etched in metal; one at lower left has random mixture of beads.



Copyrighted material

THOSE brightly colored glazed objects that you've probably admired come high if you buy them and hard if you try to make them. But you can now get the same effects by using glass beads for the glazing material, arranging them in colorful patterns, and then firing them to a glass-smooth, sparkling finish. The beads, the ordinary kind used in bead-weaving, are cheap and come in all the colors of the rainbow.

The process was discovered accidentally by Eugene D. Walter, an art instructor at the University of Missouri. When he had a piece of ordinary glazing that he didn't like, he tried throwing on a few colored beads and refiring it.

Pleased with the brilliant spots of melted color that resulted, he next tried an all-bead glaze on a sheet-copper ash tray. He found that the beads fuse to a single, hard, shiny surface, they don't run as ordinary glaze powders often do, and they retain their original color, making it possible to see at the start how the final design will look.

***Laying out the pattern.*** After the surface to be glazed has been carefully cleaned, as shown below, it is coated with gum tragacanth, a sticky adhesive, to hold the beads in place during firing.

An easy way to build up a pattern is to outline it first, then brush on the adhesive in only one color area at a time. Sprinkle on a handful of loose beads and they'll stick only where the adhesive is. The rest fall off and can be re-collected.

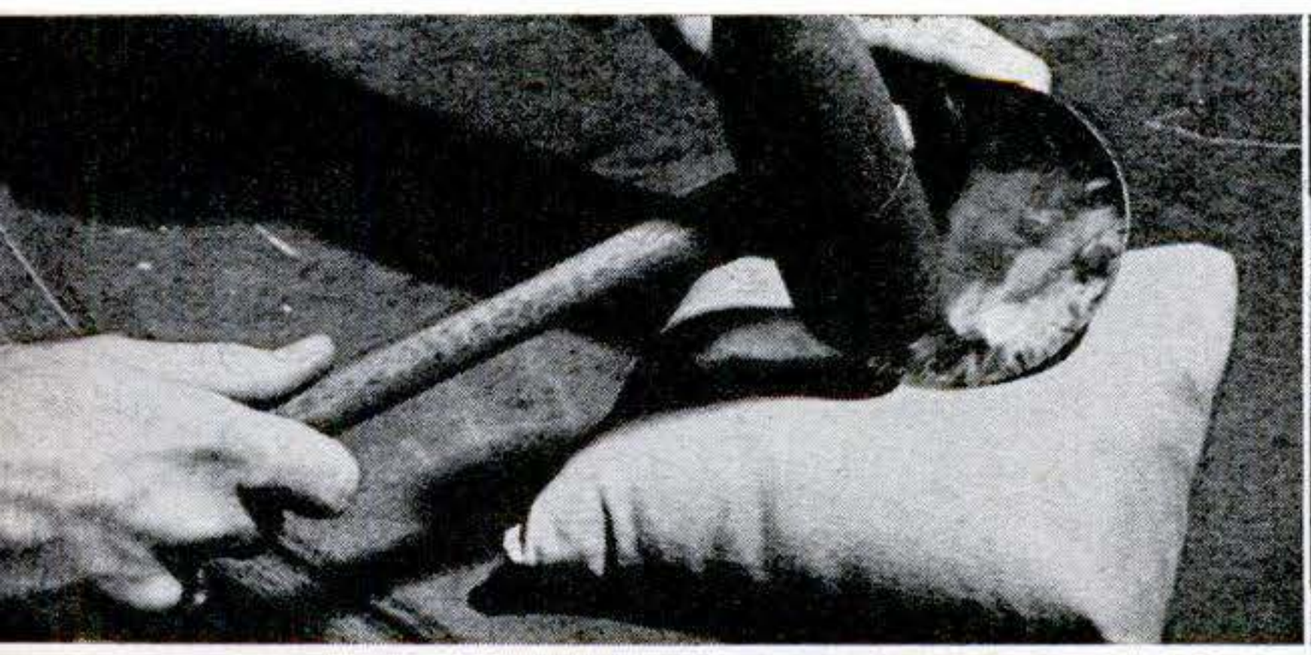
When the beads are in place, take the tip of the paintbrush handle and gently rearrange them so that they are packed closely together and the edges of the area are well defined. Then go on and apply the adhesive to the next color area, sprinkle on the beads, and so on until the pattern is complete.

**Painting pictures with beads and firing them into bright, colorful glazes is an easy way to make handsome ornaments.**

***Firing.*** The pieces are fired at 1,700° F., the melting point of the glass beads, which is within the range of all amateur electric and gas kilns. While tiles and clay articles must be fired slowly, starting from a cold kiln, it's best to put metal objects into the full heat. The beads on small articles will take only four or five minutes to melt, and this fast firing prevents excessive oxide from blocking the beads' bond with the metal.

***Special effects.*** You can get a startling kaleidoscopic effect with a random mixture of different-colored beads simply poured on and fired. If you want to glaze only part of an object, you can etch the pattern right into the metal. Areas to be left unglazed are coated with asphaltum and the piece deeply etched with nitric acid. When the asphaltum is cleaned off with ether, beads are placed in the etched depressions, fired, and the result is a hard, smooth glaze flush with the surrounding metal.

Another trick is to coat the entire surface with the adhesive and then "paint" in the picture or pattern you want, using the varicolored beads like an artist's palette. If you make a mistake, you just pluck out the wrong bead and put in the right one. If you want to change your mind, you just scrape off the beads and start over. You can't do that with ordinary glazing.—*John Trimble, San Diego.*



**SIMPLE ASH TRAY for glazing is circle of sheet copper pounded to concave shape with wood mallet and sandbag. Copper should be at least 24 gauge to prevent warping during firing.**

**METAL IS CLEANED before beads are put on. Use 30-percent solution of nitric acid to remove dirt and grease so that glaze will make firm bond. Keep acid off hands and clothing.**

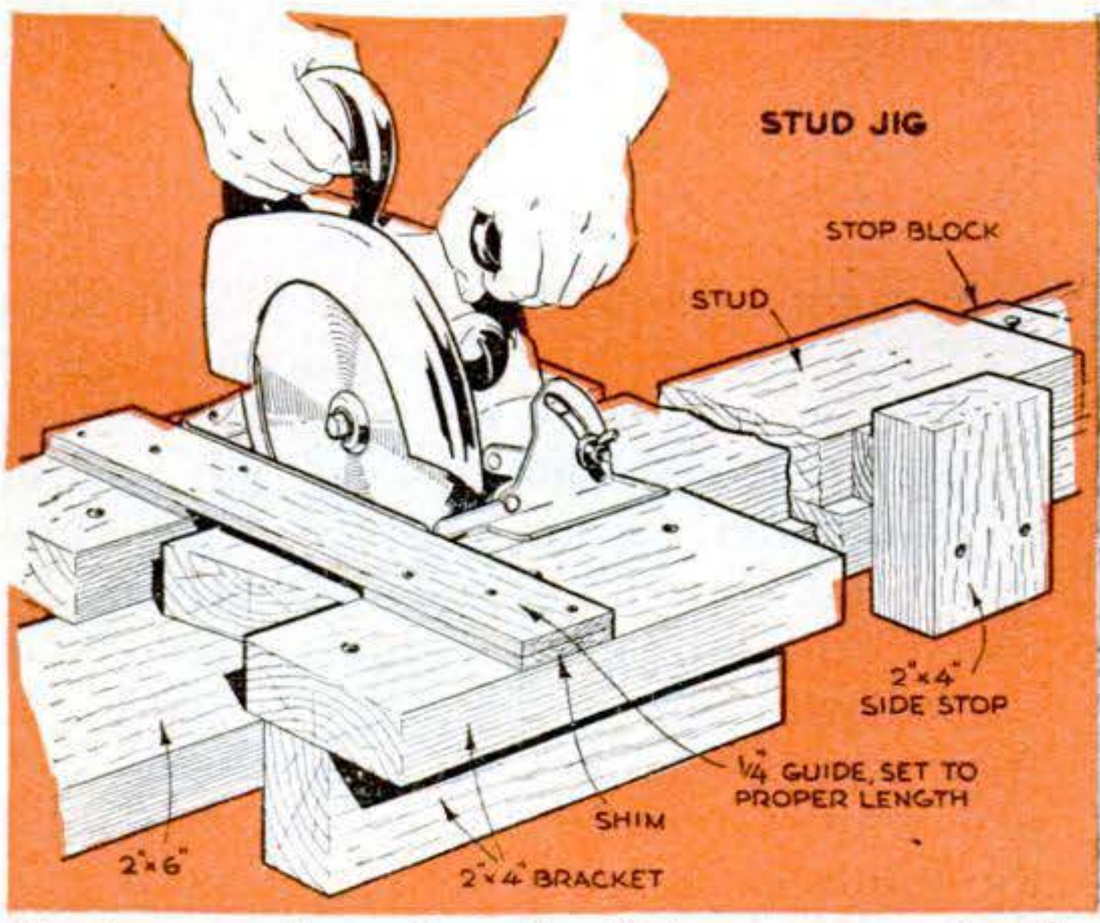


Copyrighted material

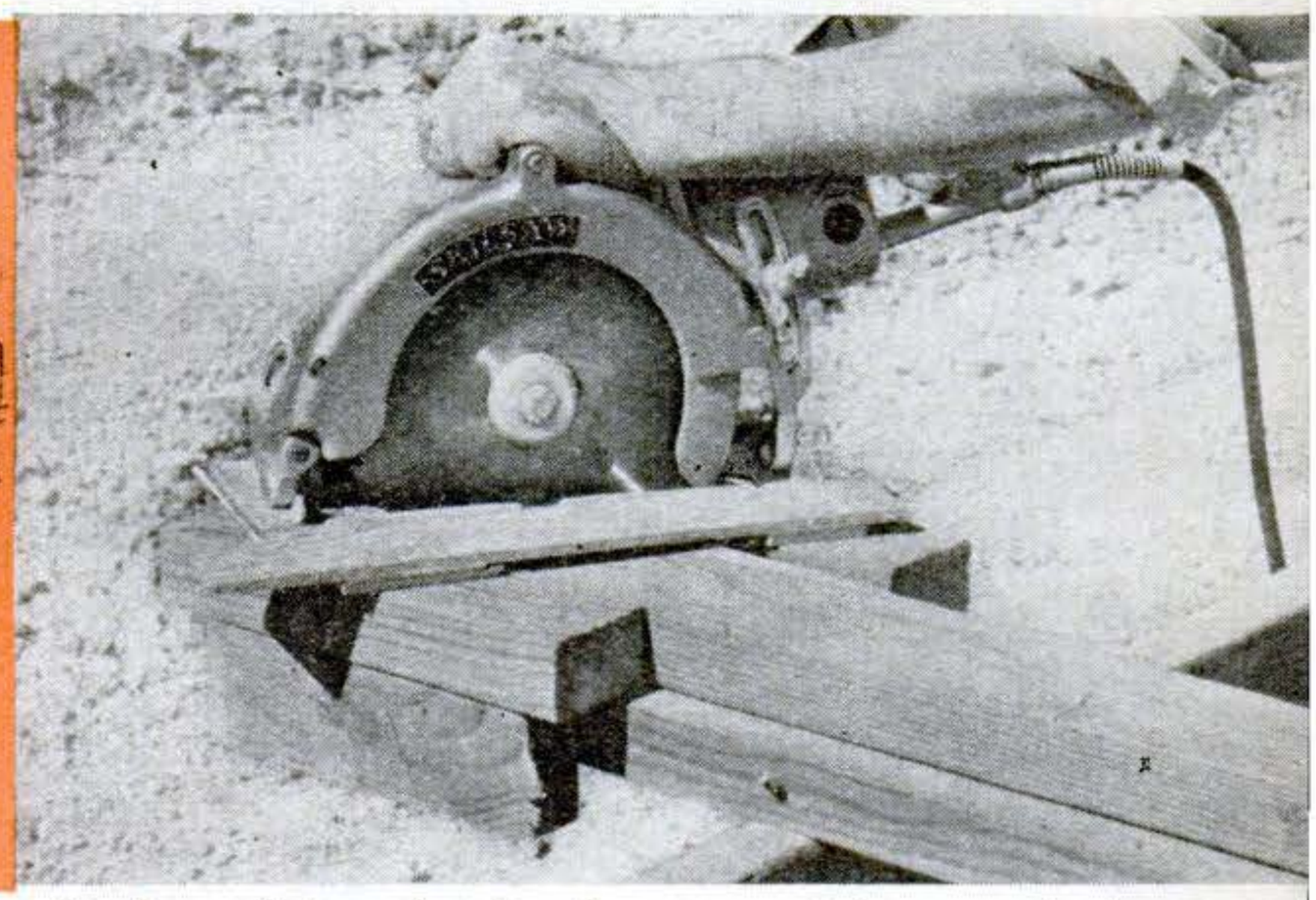
# Jigs Save Saw Time

By Edwin M. Love

THE portable saw itself is only half the outfit. To increase its cutting speed and make it do jobs that could not be accurately done freehand, there are a number of jigs you can build. They will support the saw and guide it with all the accuracy of the more precise, but less convenient table saw or radial guide. Build a table for it, too, to convert it into a tilting-arbor table saw for cutting and beveling small work. Photos on these and the following pages show you how.



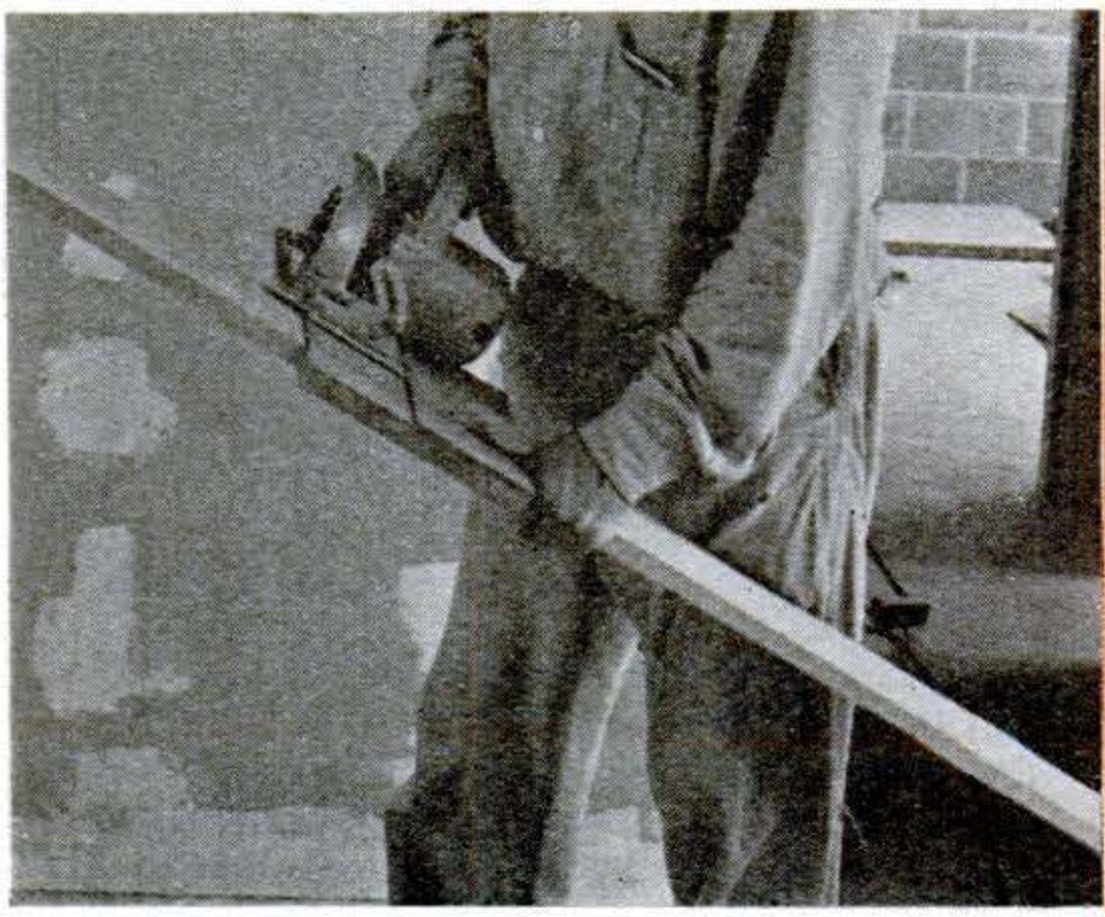

**Cutting studs to length.** Set up on a pair of horses, this jig makes short work of cutting studs to identical lengths for framing. A stop block and side guides nailed to a length of two-by-six permit rapid loading and unloading after cutting. Plywood strip on shims guides saw.

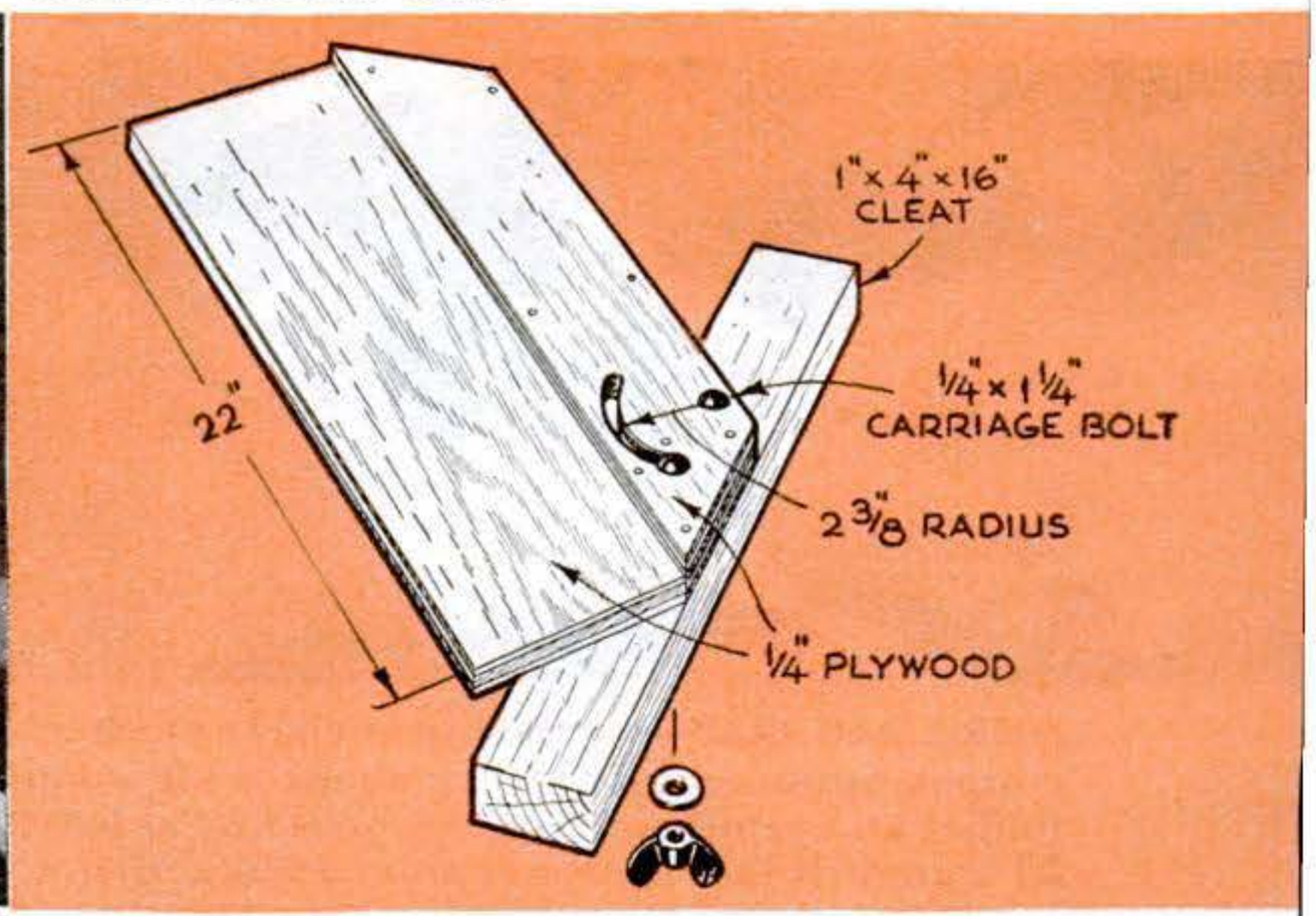


**Angle and length of rafter** are cut in one setting. This jig is similar to the stud-cutting jig at left above except that plywood guide is set to correspond with pitch of roof. Jig can also be used to establish location of plate notches, which are then cut freehand.

**Squaring jig.** Held in place with the left hand, a simple jig guides the saw to make square cuts on board ends. The sole of the saw rides on the lower piece of plywood, while the upper half-piece guides it across the work. Cleat, 1" by 4", sets jig square.

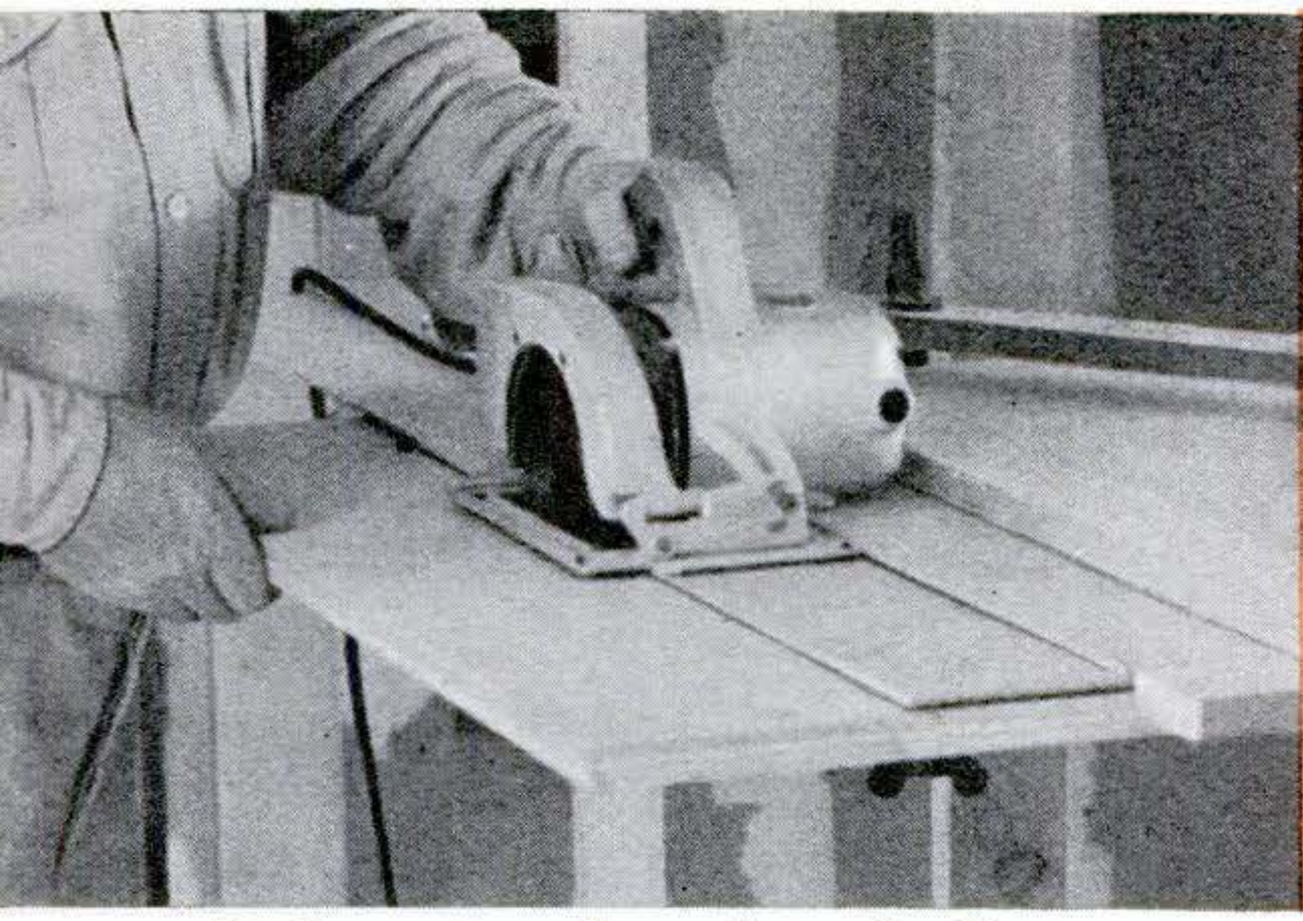
**Adjustable squaring jig.** This jig works on the same principle as the one at left. Its big advantage is that it pivots on a ¼" carriage bolt and can be locked to guide the saw at any angle. Adjustable bevel is used to set jig to desired angle of cut in relation to cleat.

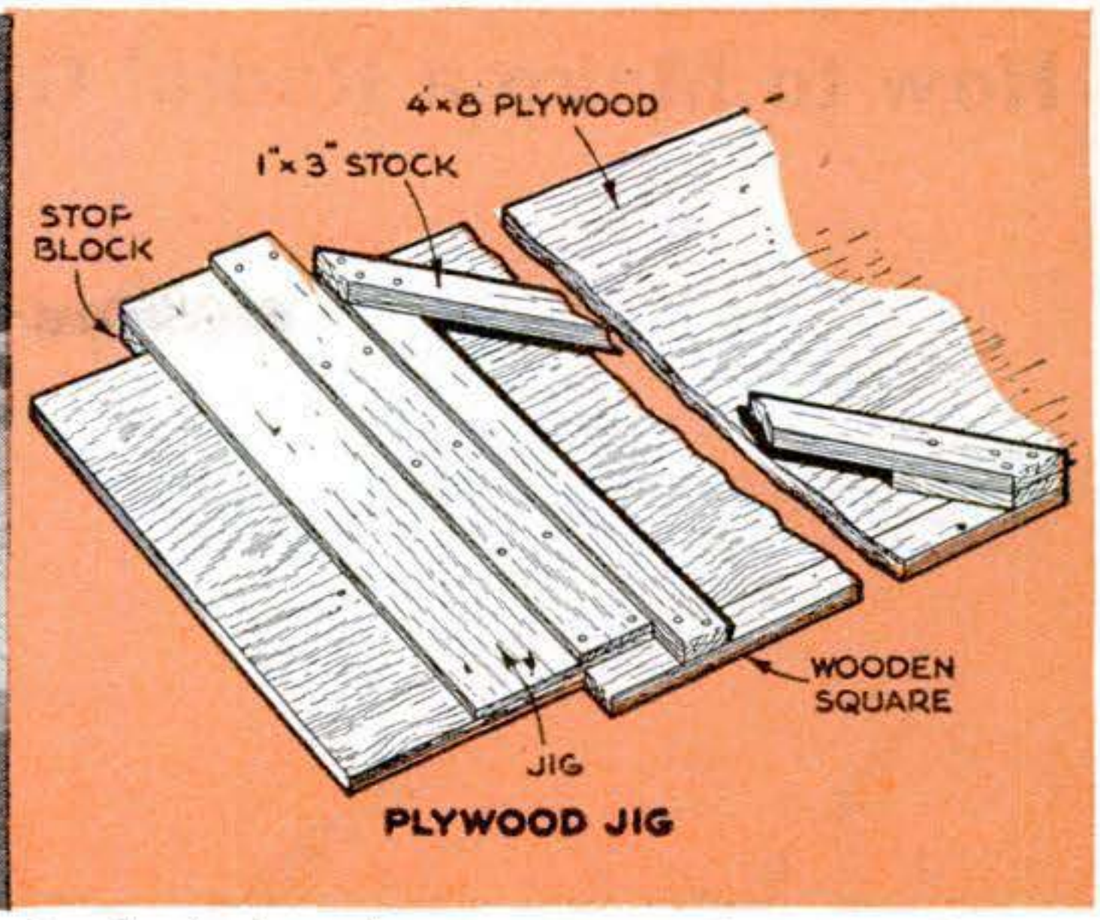







Copyrighted material

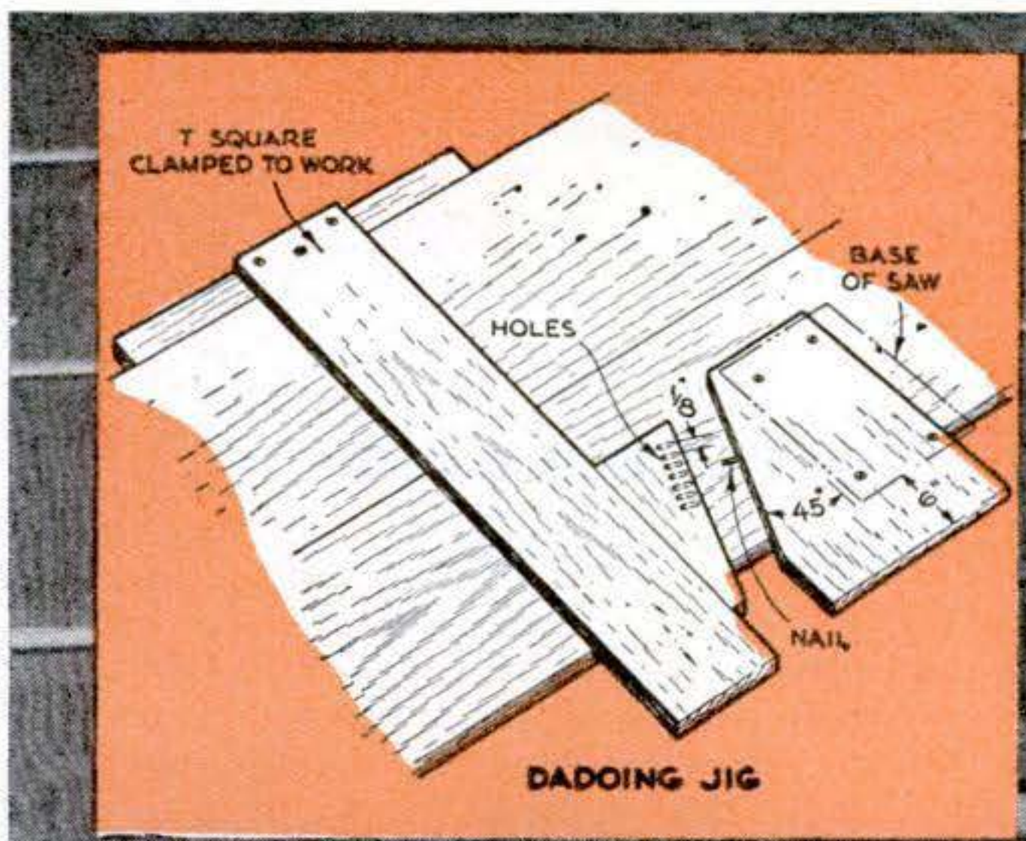




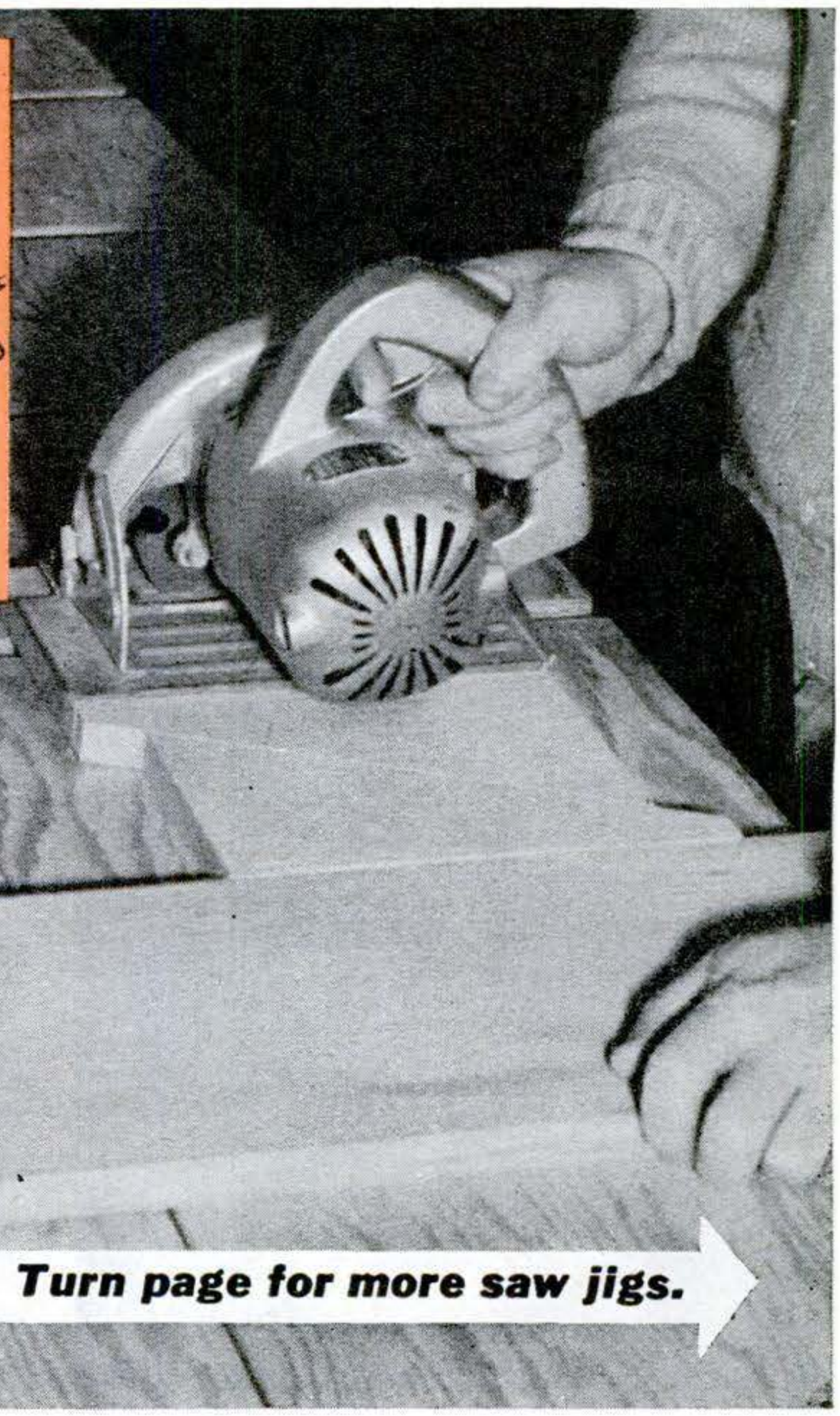
PLYWOOD JIG

**Jig for cutting plywood panels.** True cuts can be made in large panels with the aid of the jig above. It is an elongated version of the squaring jig, backed up by an oversize T square. In use (left above) the square is clamped in position and the jig bears against it.

**Dadoing jig.** Rapid adjustment of a clamped guide fence to make several successive passes when cutting dadoes is impossible. This two-piece guide built by W. G. Waggoner moves the saw one kerf width after each pass. To use, clamp the squaring board to the work and attach saw to large half of two-piece base. After each cut advance the nail to the next hole in the smaller piece. The 45° meeting surfaces of the two parts move saw outward about 1/16".



DADOING JIG

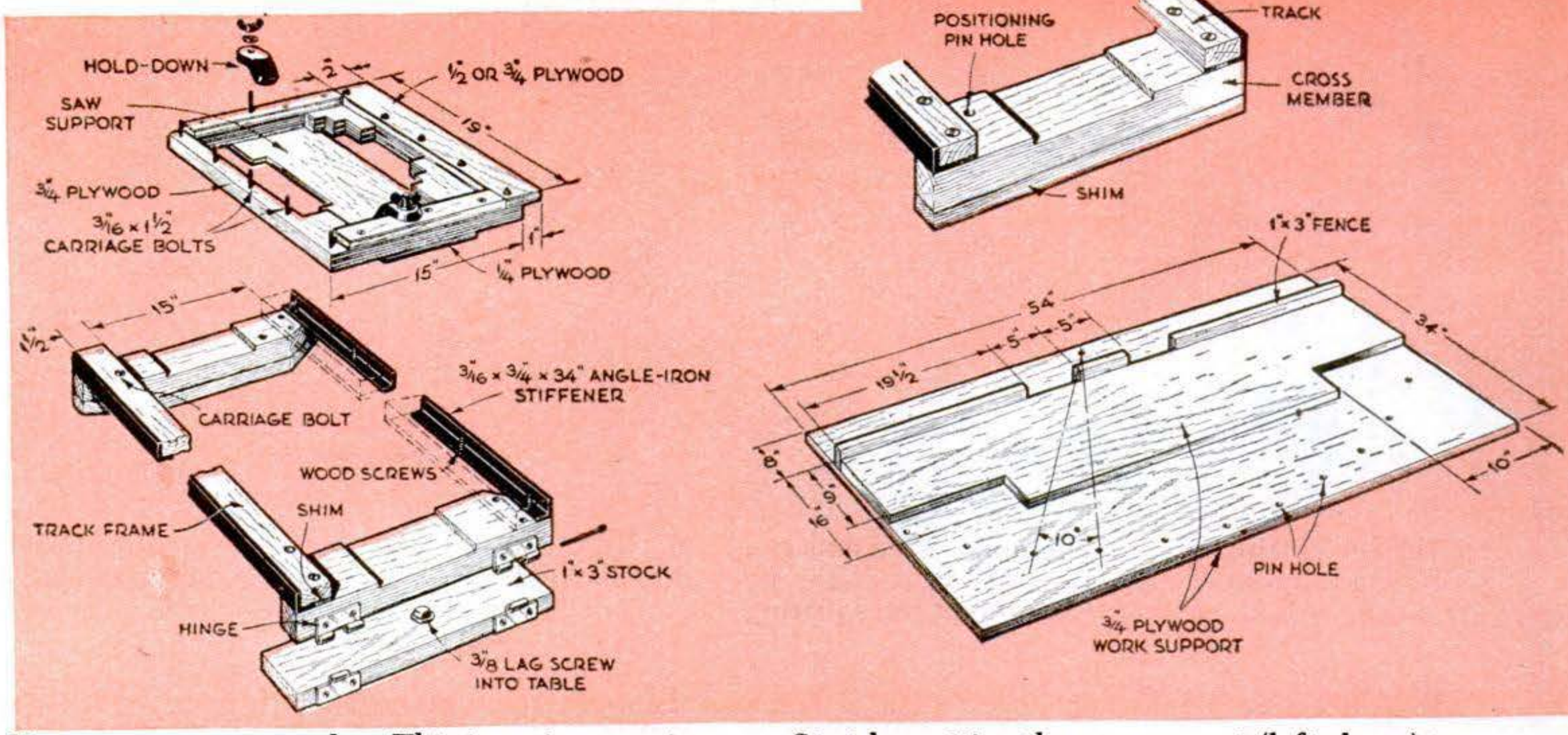


**Turn page for more saw jigs.**



Copyrighted material

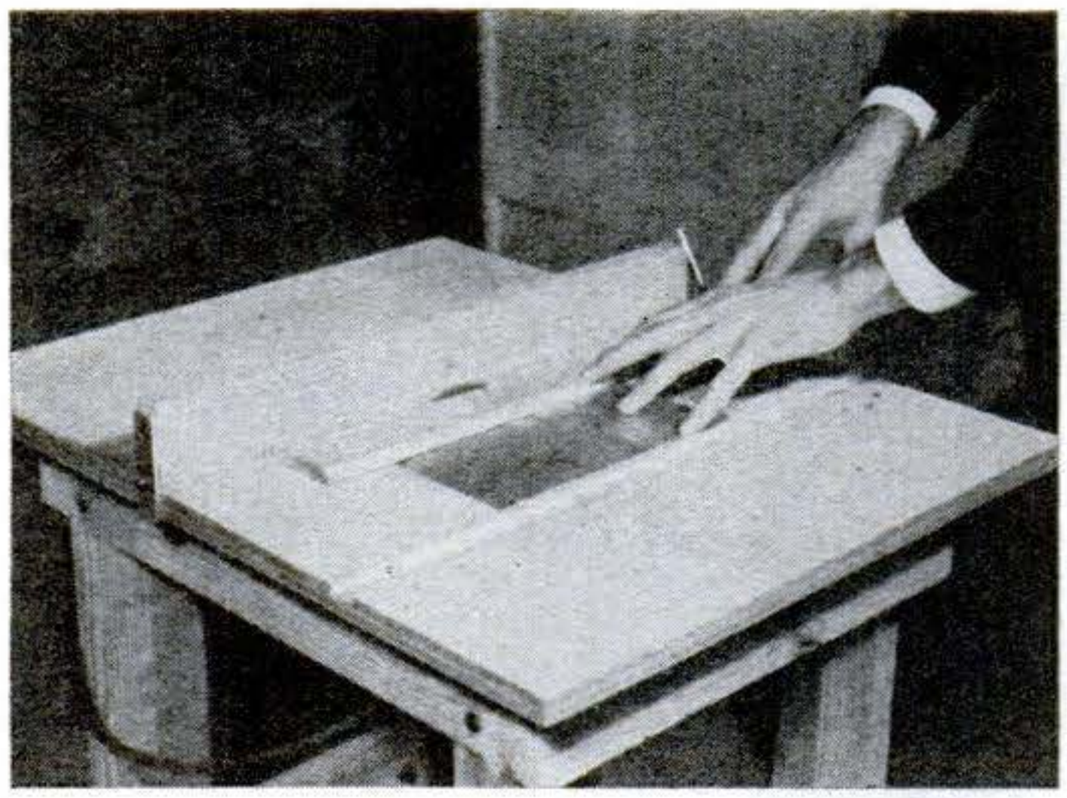
# How to Make a Radial Guide

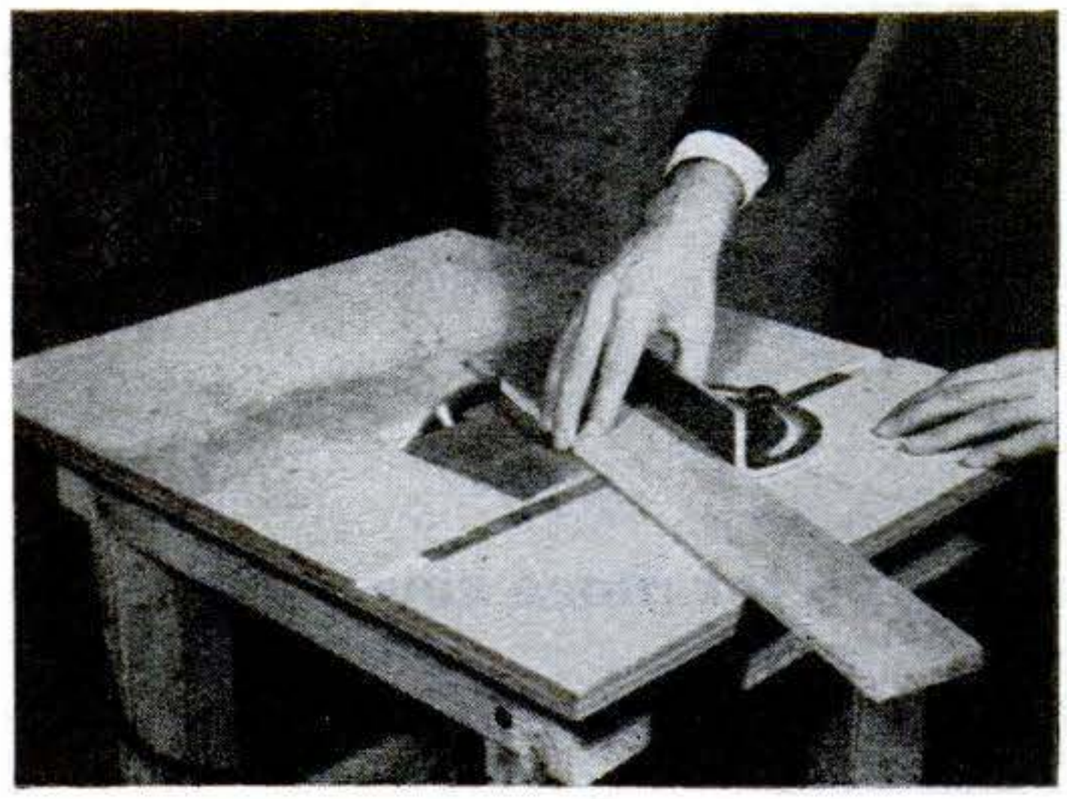



**Put your saw on tracks.** This is an inexpensive substitute for a radial-arm support, consisting of a pivoted track and sliding carriage. It will handle practically all the cross-cutting, beveling and dadoing operations performed by conventional radial-arm supports, but it cannot be turned parallel with the work for ripping. This is no great handicap, however, as the saw itself, with its ripping guide, does this quite well.

Start by cutting the saw support (left above) to fit your saw, and then fit the support into a frame of ¾" plywood. Mount the two wooden hold-downs on bolts in each end to complete the carriage. Wing nuts lock the hold-downs securely on the saw shoe.

The track is also constructed as a frame reinforced with two strips of angle iron. Clearance is cut out of the track cross members to pass the





# Building a Table for Your Saw

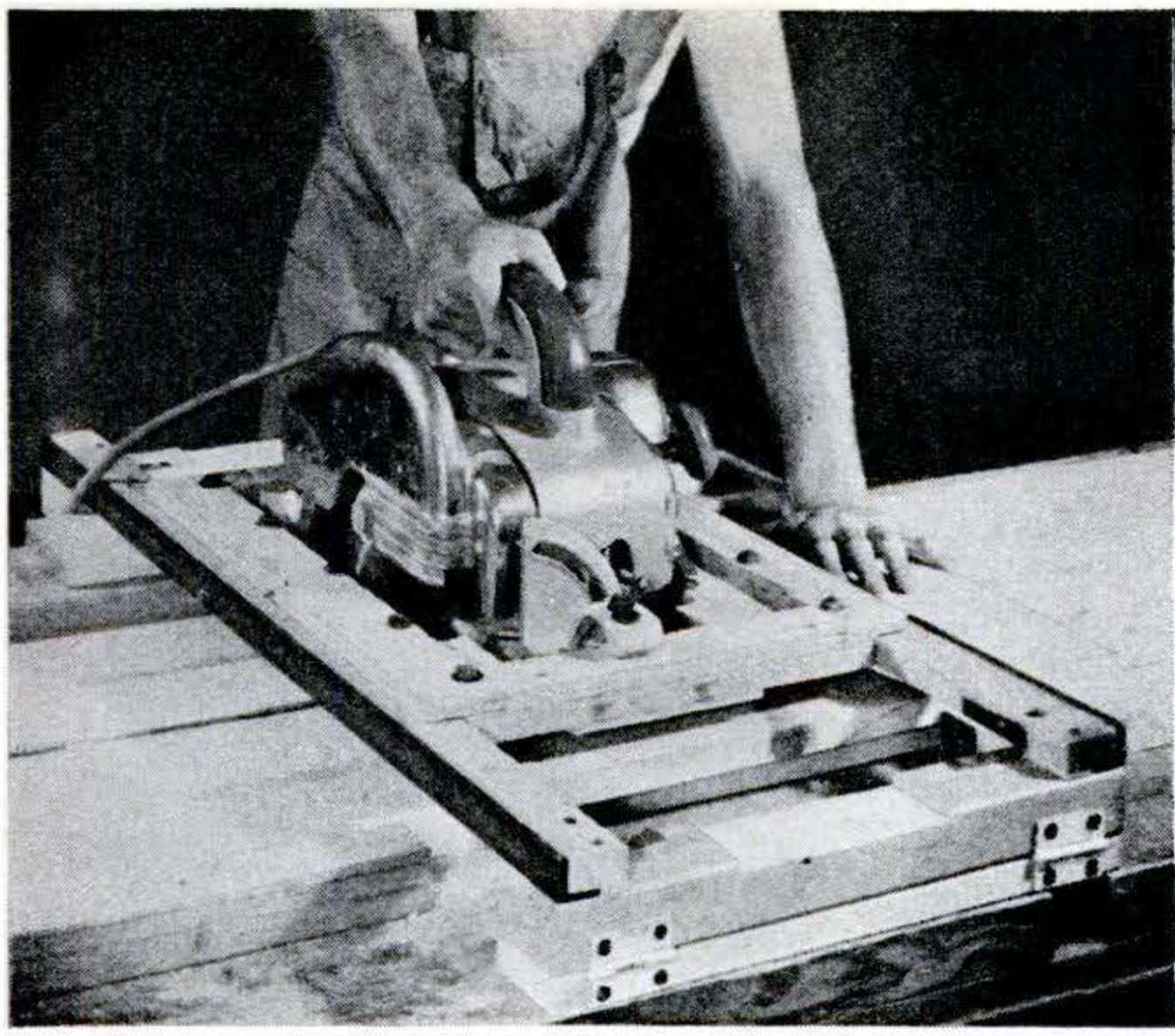
**Set it in place for small work.** This table, built from two-by-four scraps, enables you to use your portable saw as a tilting-arbor table saw. The table top is cut from ¾" plywood (preferably birch), and rabbeted out in the center to receive the sole of the portable saw in an inverted position. Using a framing square as a guide, draw lines ⅛" apart on the table surface from front to back to aid in setting the rip fence. Cut a groove parallel with these lines for the miter gauge. Coat with shellac or clear lacquer. Use a rubber band to hold the trigger switch on saw in "on" position and plug saw into a receptacle on leg controlled by a separate toggle switch screwed to the table.

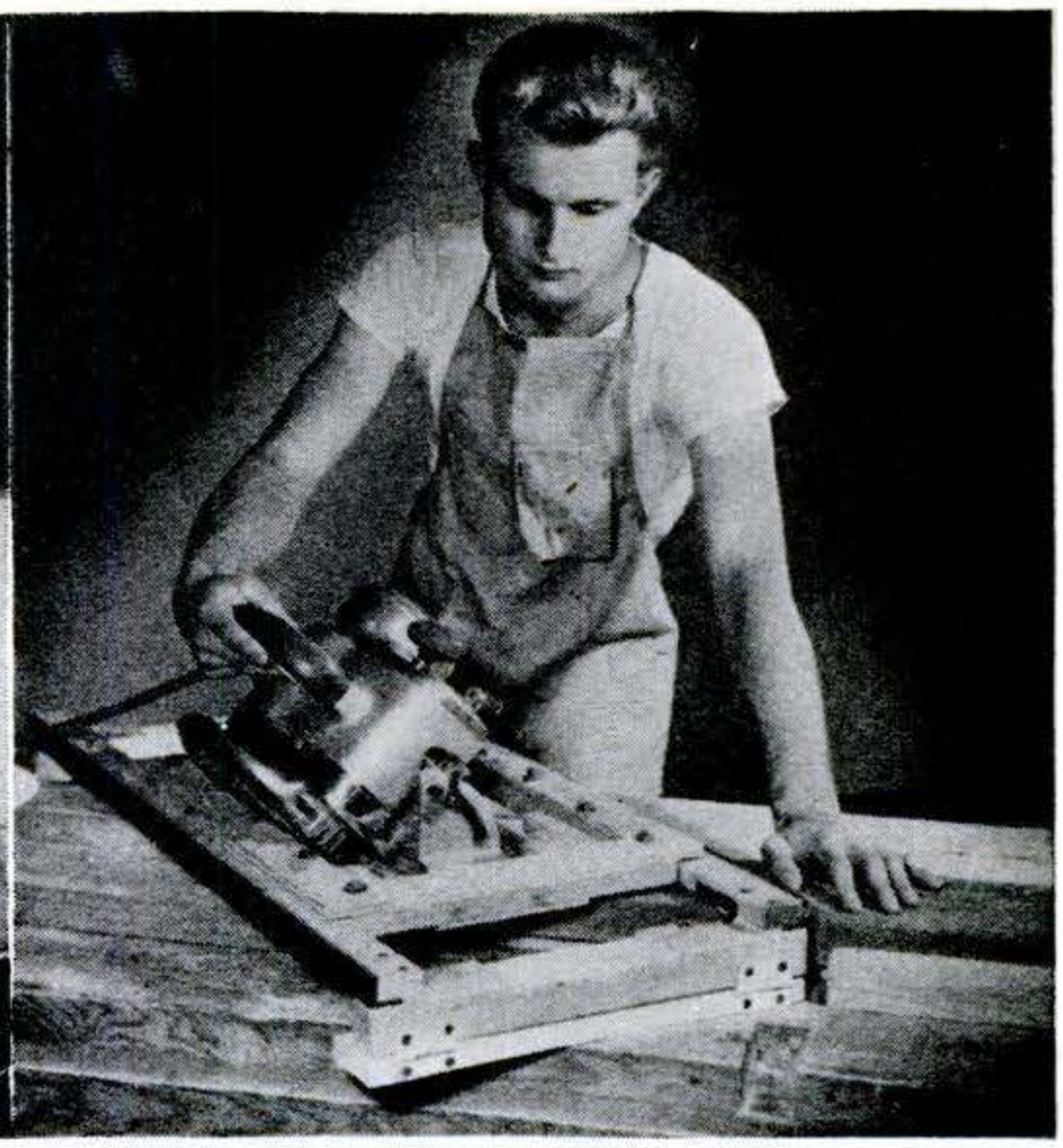
The rip fence consists of a piece of hardwood slotted to house the long ¼" clamp rod. A nut soldered on the handle end acts as a shoulder permitting a turn of the rod to pull the bracket on the opposite end tight against the table edge. The miter head is made from a piece of aluminum angle pivoted on a ⅛" by ⅝" aluminum bar of suitable length.

The designer of the table, John Rogers, reports that the depth-of-cut and tilt adjustments on the portable saw permit all the sawing operations possible with a regular table saw, including dadoing and compound mitering, giving the equivalent of two saws for the price of one.



Copyrighted material

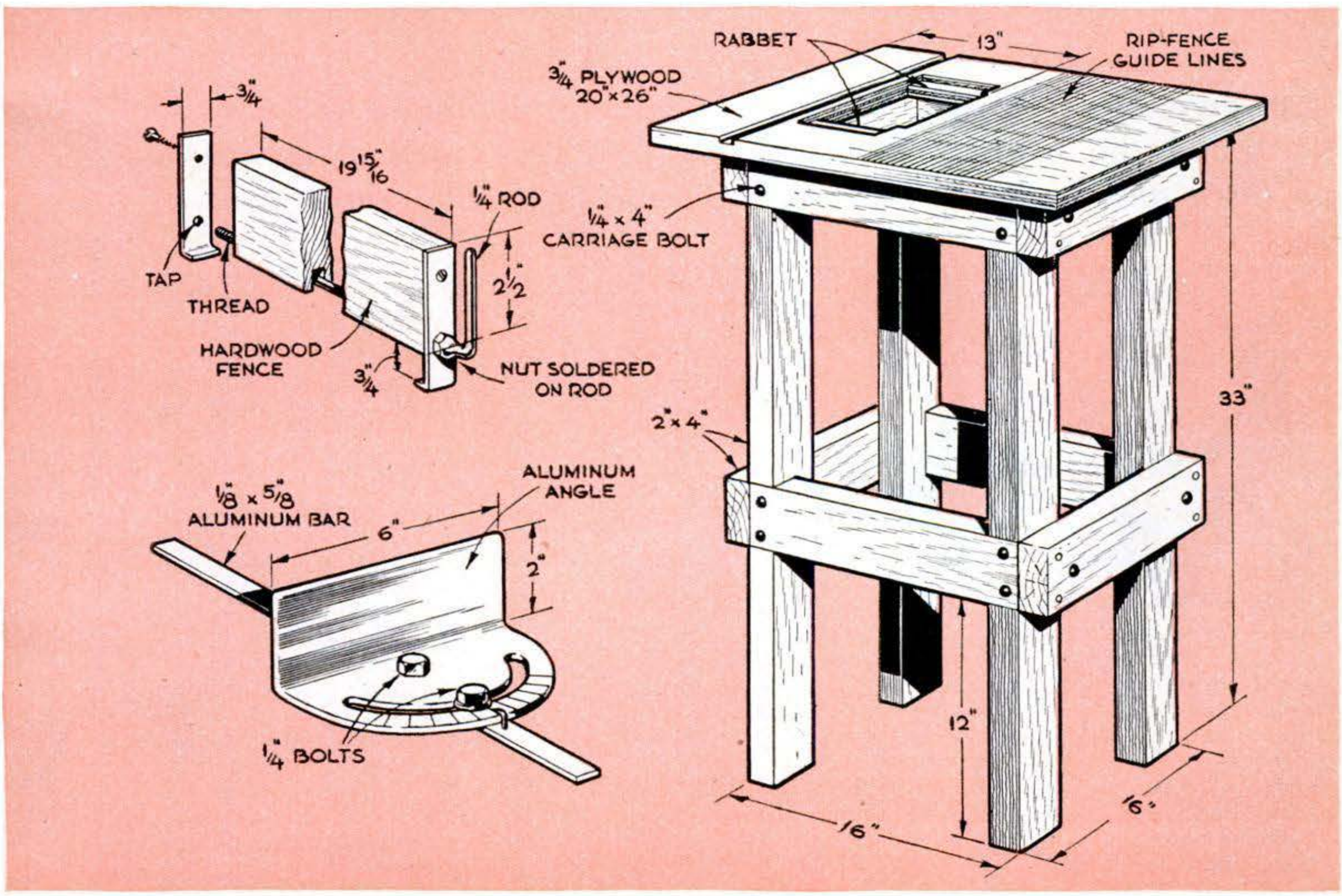




saw support, which projects below the carriage. The track hinges on a 1" by 3" cleat that pivots on a ⅜" lag screw protruding from the radial-guide table.

The radial-guide table makes the outfit complete and portable. It is built up on a base of ¾" plywood. The work support—which may be replaced if cut into too often—is screwed against a 1" by 3" fence. The fence and both ends of the work support are cut away to permit the track to pivot freely. A pivot pin locks the track in square and 45° positions; other holes may be drilled at 10° intervals or as needed.

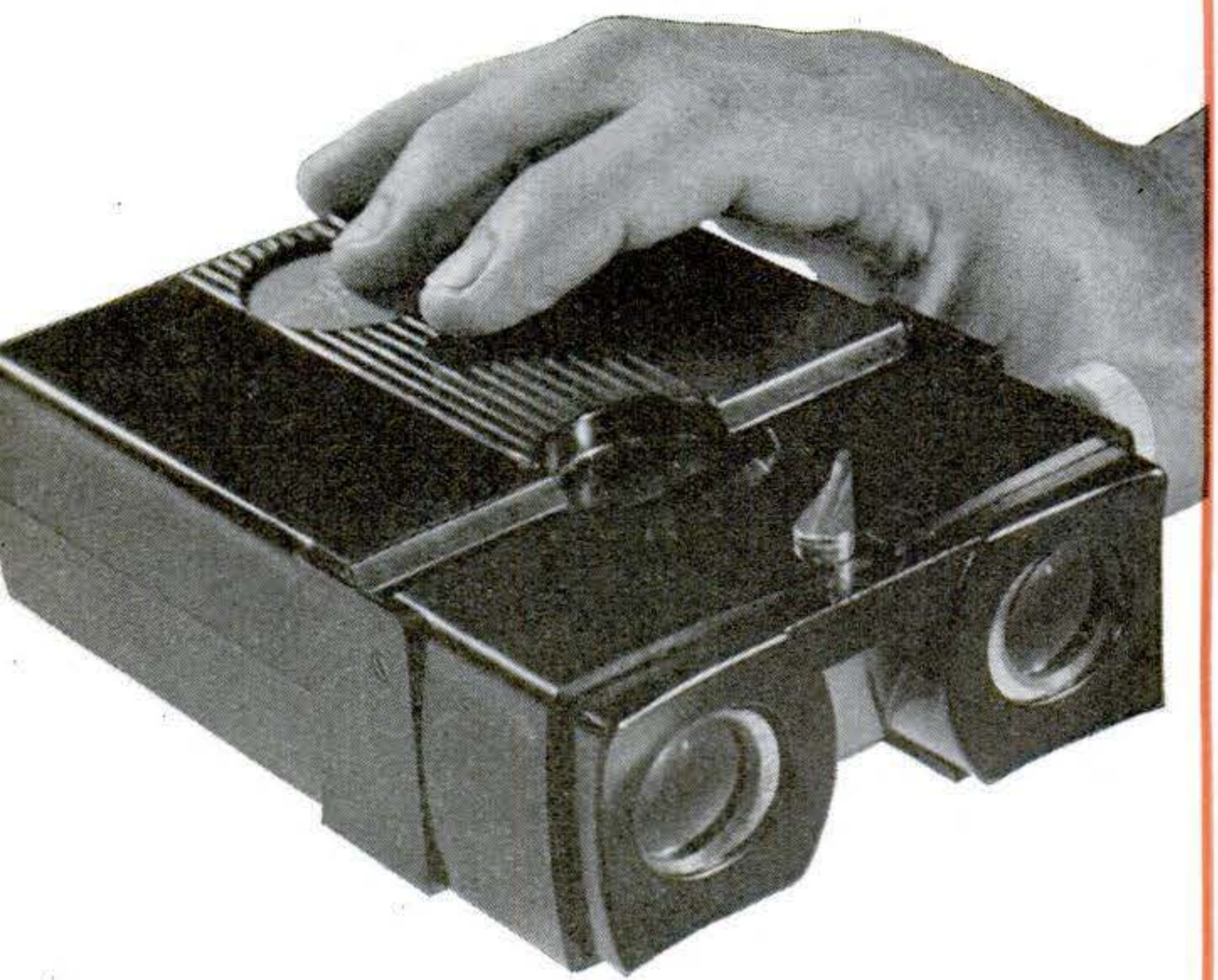
The photo at left above shows a husky portable saw squaring off a board. At right, a compound miter is being cut by tilting the saw blade and setting the track at an angle. Wax the track with paraffin for smooth operation.





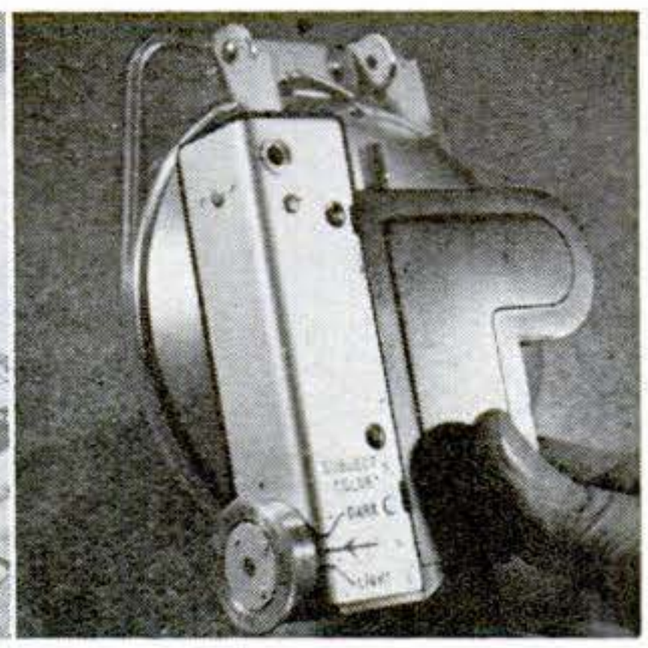

Copyrighted material

# New Cameras Popularize Stereo Photos



**Half a century ago** a stereoscope like the one above was found in nearly every parlor. Modern viewers work the same way but are more compact. Two of the many viewers you now can buy are pictured on these pages—the Stereo-Realist at the left and the Brumberger on the facing page. Both of them have battery-powered viewing lamps that are operated by a switch button.

***Look what has happened to Grandma's old-fashioned stereoscope. Using the new cameras, viewers and accessories, you can add a third dimension to your photos, and in lifelike color, too.***



**Accessories** for the new View-Master stereo camera include a cutter for home mounting of stereo pairs. As you cut the pairs, you slip them into slots on opposite sides of a cardboard reel, seven pairs to a reel. Partly cut film shows how View-Master camera first makes exposures along one edge of film, then raises lenses and makes second row of photos while film is turned in opposite direction. Flash unit includes a range finder (above right) that automatically gives correct lens aperture for the distance and color of subject.

**Cameras.** The Stereo-Realist, the 35-mm. camera that revived interest in stereo pictures, now has some rivals. Like the Realist, the newcomers have f/3.5 lenses and built-in flash synchronization. The Iloca, made in Germany, boasts a self-timer (so the taker can get into picture) and has the fastest shutter speed, 1/300 second. The Busch Verascope, which comes from France, and the Realist and Iloca give you transparencies the width of 35-mm. film, approximately 25 stereo pairs on a normal 36-exposure roll. The View-Master departs from this scheme, takes smaller shots, and you end up with 69 stereo pairs from the same amount of film. After shutter speed has been chosen, turning a dial on top of this camera sets diaphragm to suit the prevailing light condition and subject color.



Copyrighted material

YOU may still remember the thrill you got that day in Grandma's parlor when you first lifted a stereoscope to your eyes. You gasped—and moved back a step. The scene seemed so real and the precipice so close that you were afraid of falling over.

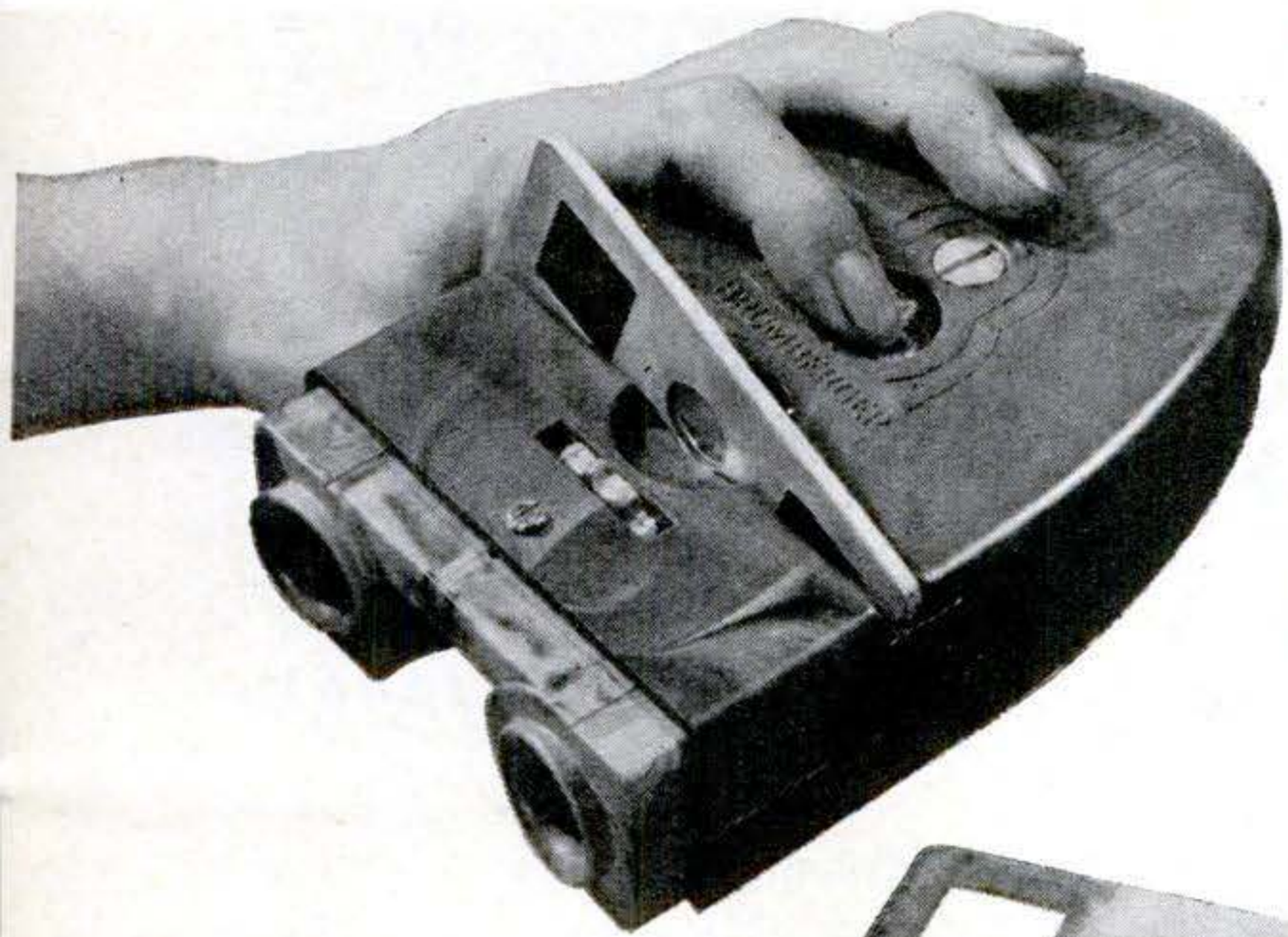
The principles of stereo viewing haven't changed a bit since Grandma was a girl, but the methods have. Today, you have an increasing choice of equipment—cameras, viewers, projectors and slide-mounting gadgets—to take and show your own stereos in color.

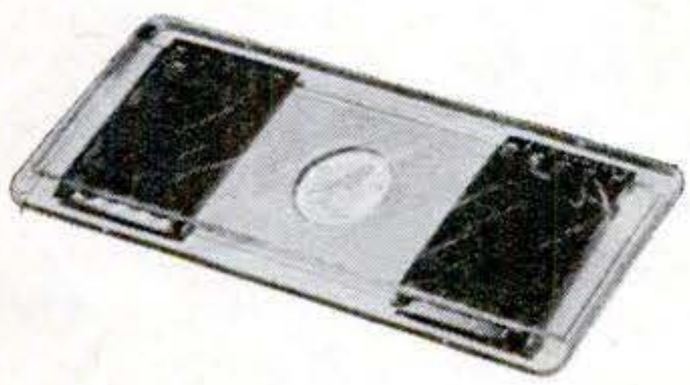
The current popularity of stereophotography began shortly after the war when the David White Sales Co. of Milwaukee introduced the Stereo-Realist camera for taking stereoscopic pairs of pictures.

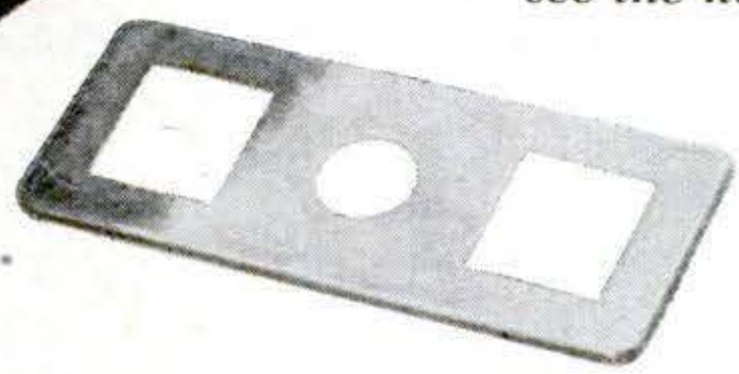
Since then, thousands of amateurs, no longer satisfied with the flatness of normal photos, have put their albums aside and are concentrating on building a file of stereo slides that give a realistic roundness and third dimension to the subjects. Business men use stereo to demonstrate a product or manufacturing process.

As a hobby, stereophotography still is expensive, but new cameras now being planned may bring prices down. A camera made by Sawyer's Inc., Portland, Ore., cuts film costs by cramming more pairs on a single roll. Seven pairs of pictures are mounted on a cardboard disk. To view them, you insert the disk in a special viewer and then revolve it.

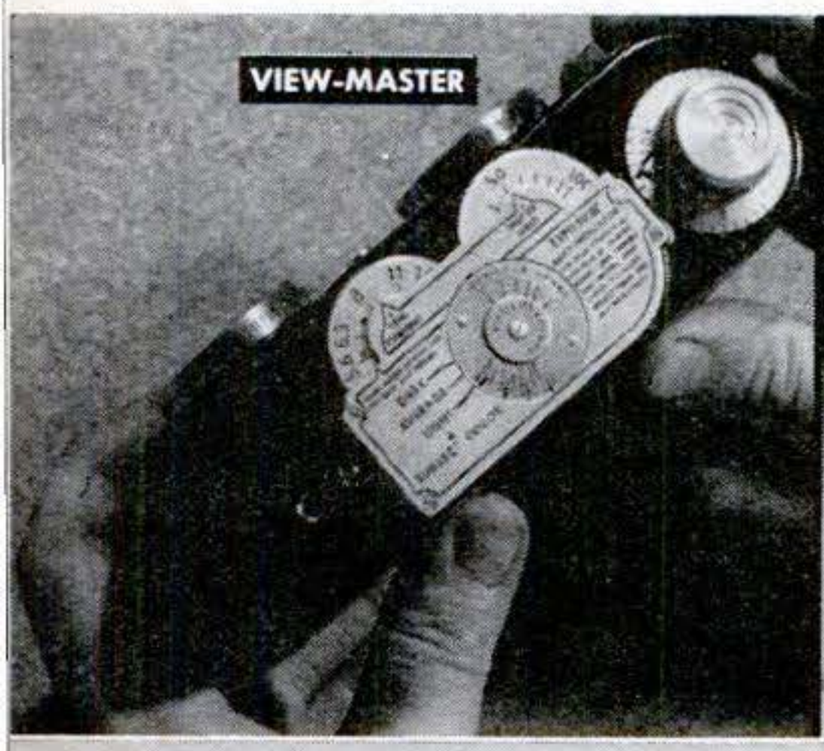
***For an explanation of how stereo works see the next two pages.***

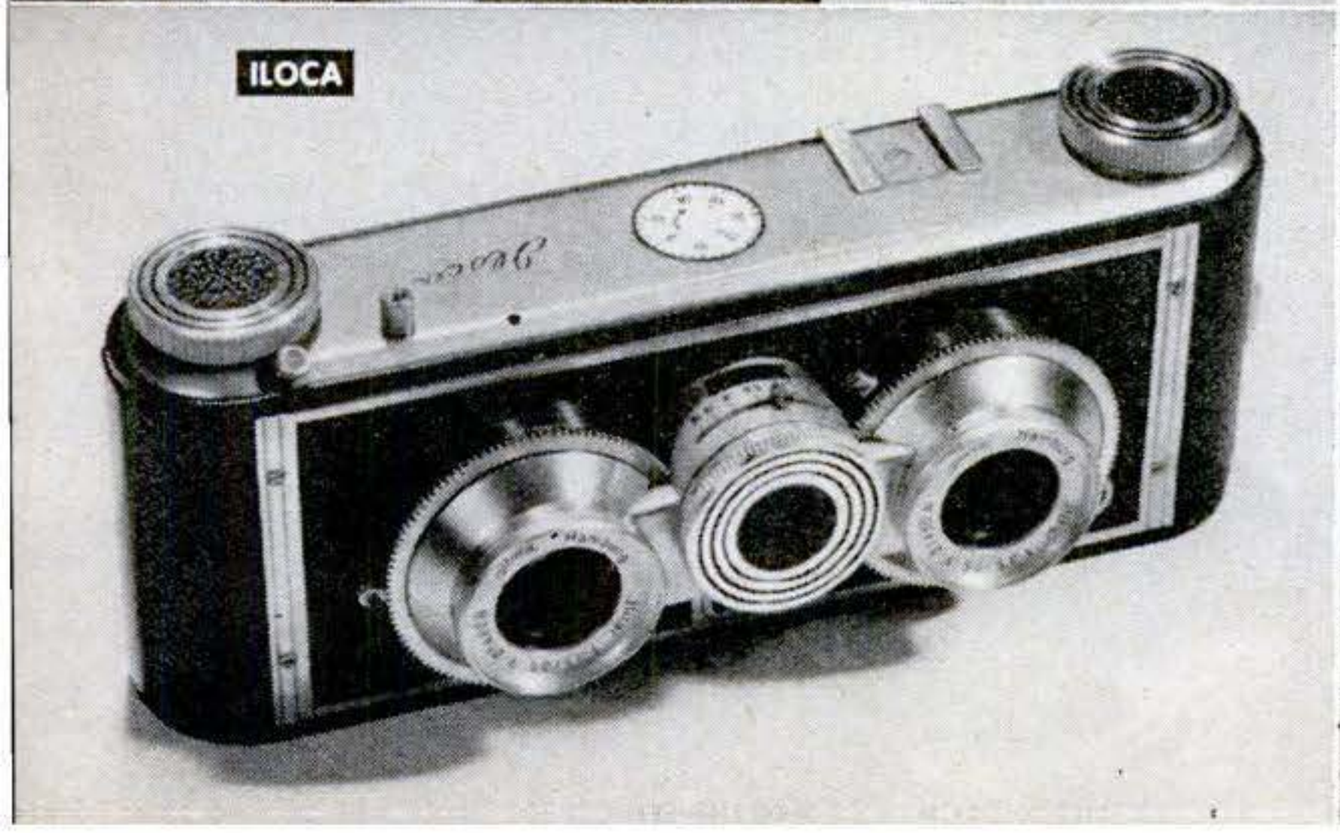




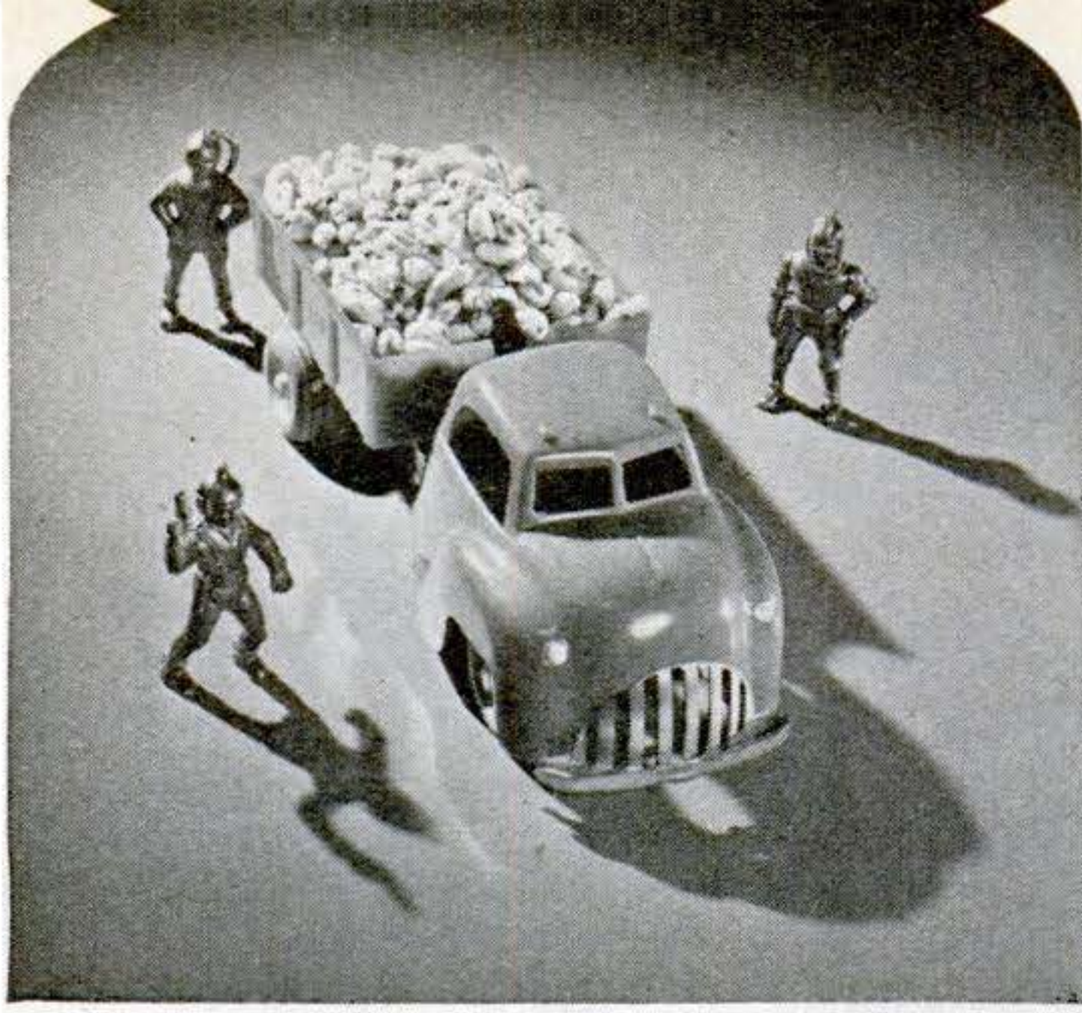


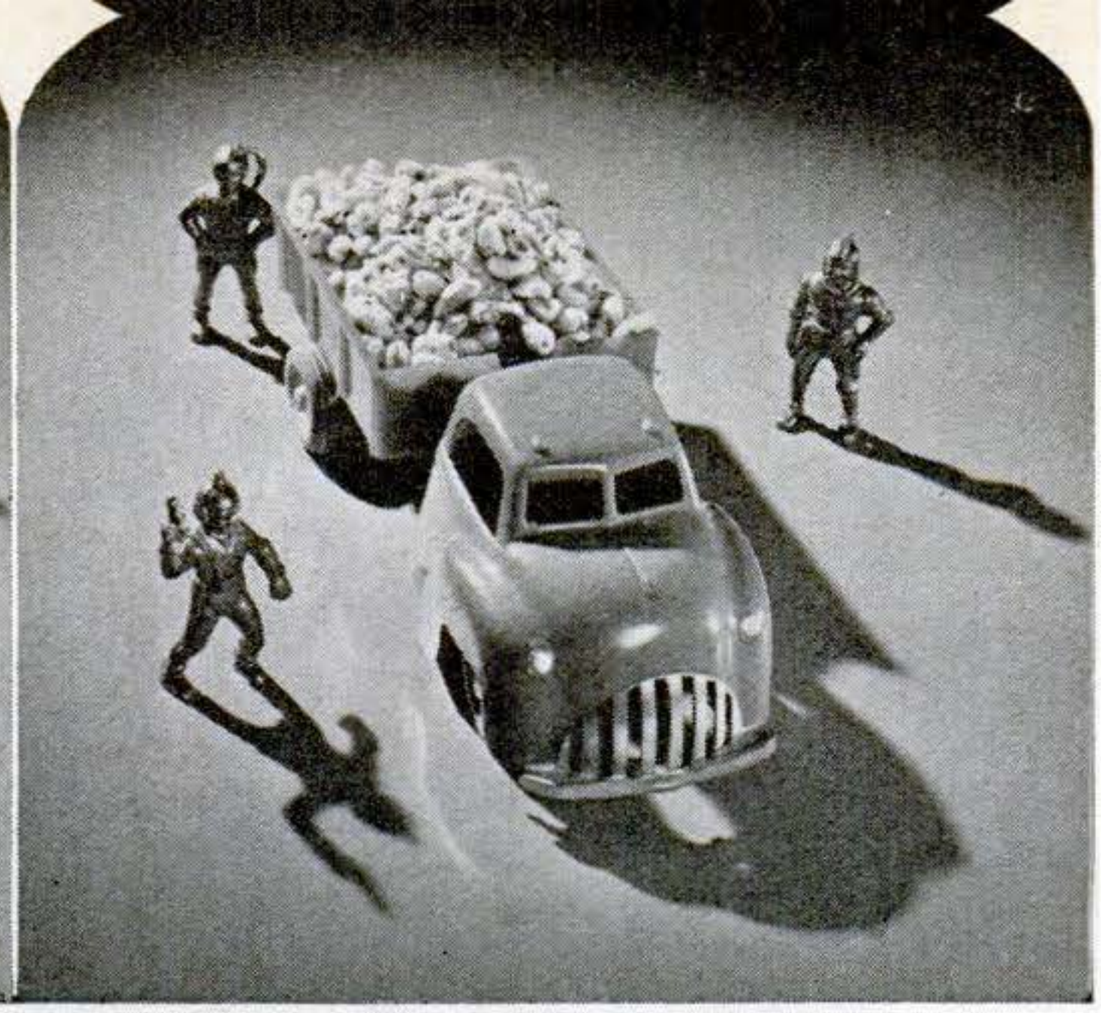
**Metal binders** (left) are sold for home mounting of slides. A chart supplied with the binders shows where to cut matched transparencies. Prongs align transparencies, and the halves of binder snap together, sandwiching pictures between glass.





Copyrighted material

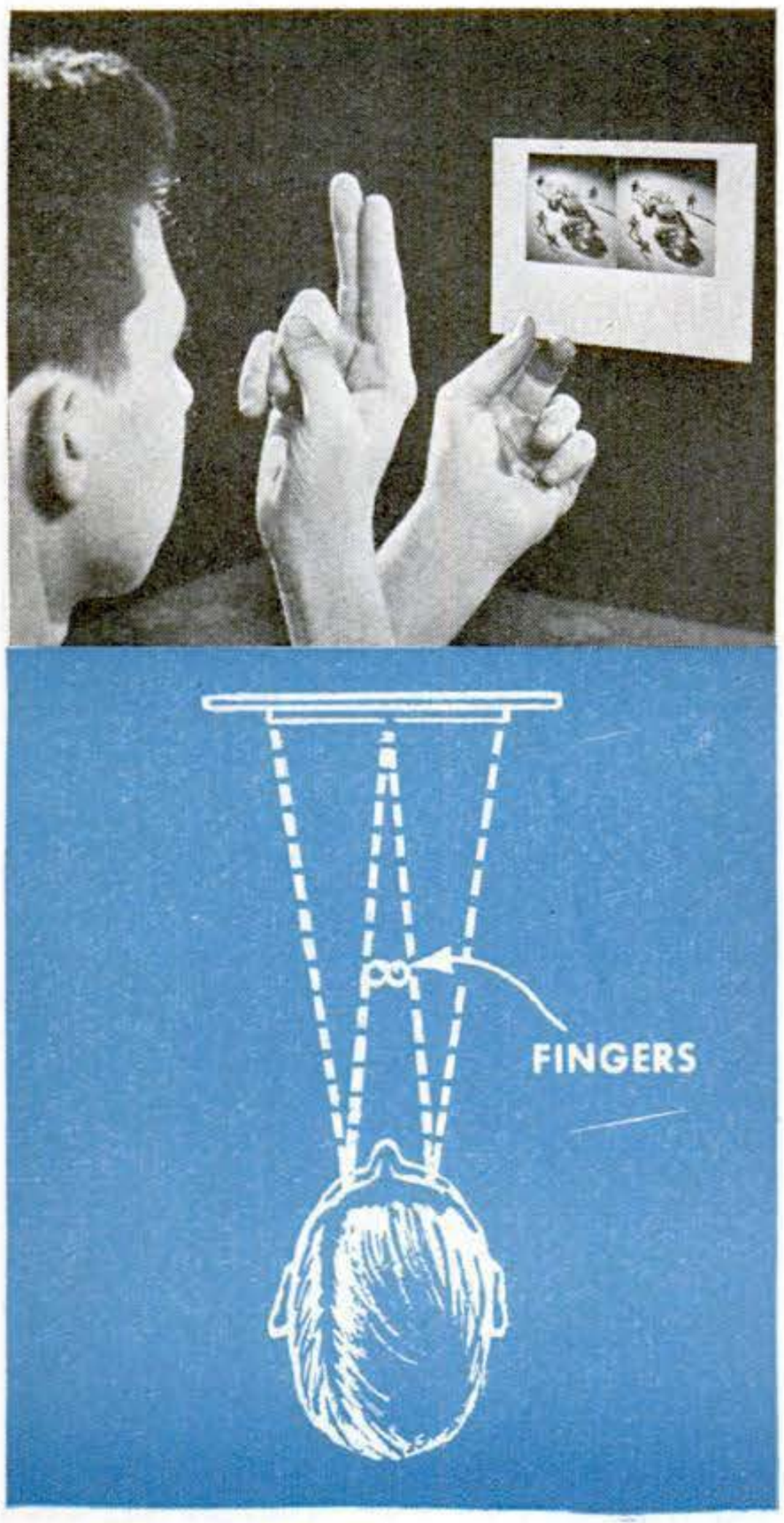




# Stereo Fools Your Eyes

***You don't need a special viewer to see the pictures above in full third dimension. Here's how to do it.***

**By Kenneth M. Swezey**
*Author of* Science Magic




LIKE the new Cinerama movies, stereo photos draw you into the picture. An illusion of depth creates the impression that you are right in the middle of what you are seeing.

Cinerama works its tricks by a combination of multiple projectors on a curved screen, but stereo still pictures achieve a third dimension on principles as old as man. In fact, they imitate a trick that your eyes play on you. A pair of pictures usually are taken simultaneously by a camera that has two lenses spaced 2½″ apart—about the same as your eyes. When you look at these slightly dissimilar pictures in a viewer, each eye sees only the view taken by the corresponding camera lens. Your brain fuses the two pictures into one.

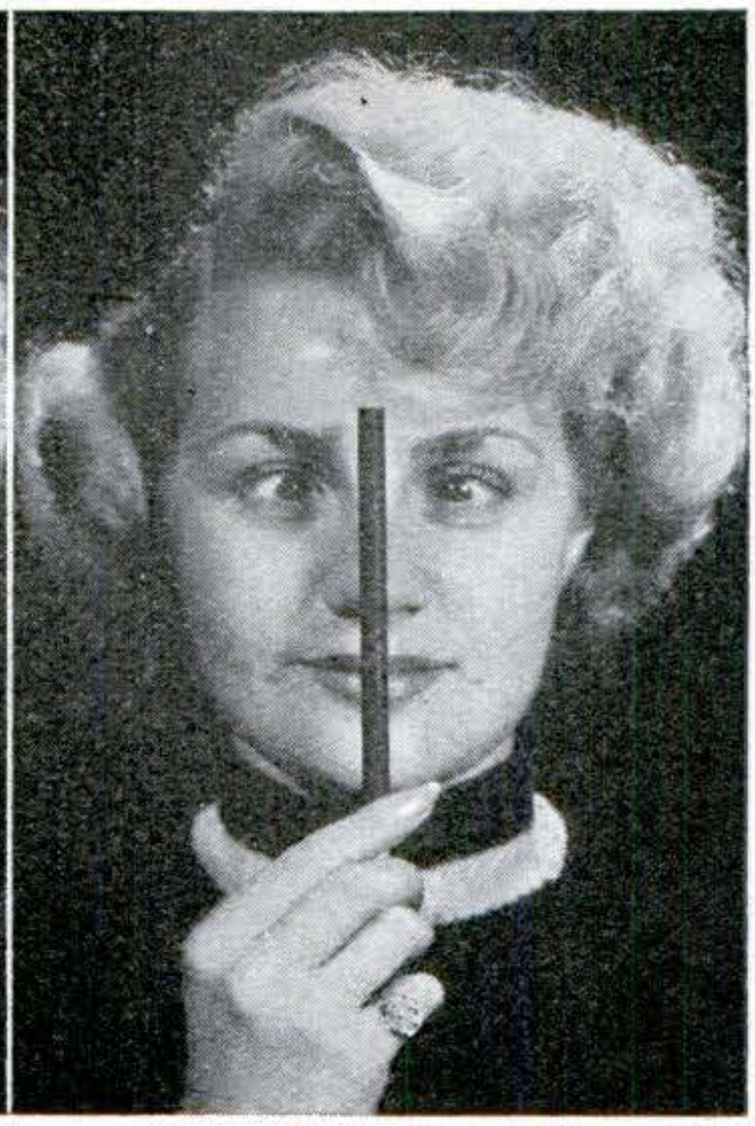
To see stereo pictures in the third dimension you must relax your eyes so they are directed straight ahead. The lenses in the ordinary viewer help you do this. But with a little practice you can see a stereo pair in three dimensions without a viewer.

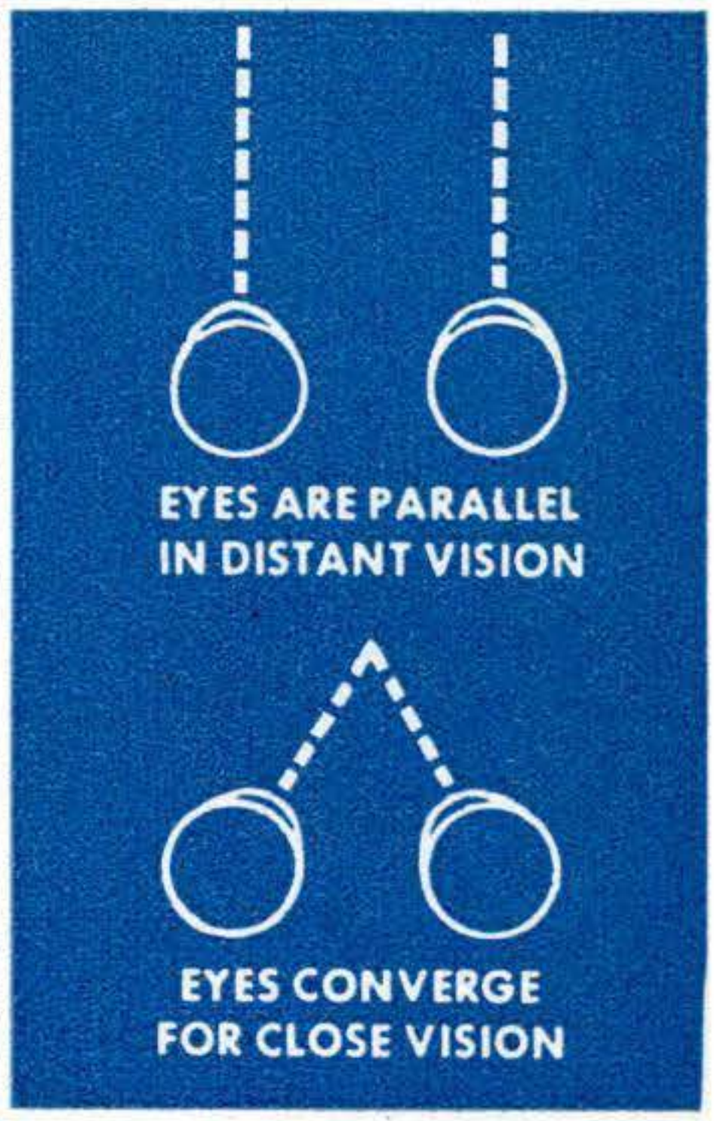
Hold two fingers between your eyes and the stereo pair at the top of the page as shown at the left. Place your fingers so that your left eye can't see the right photo and the right can't see the left. If you can now relax your eyes, the pictures will merge.

Eventually you may be able to do this without using your fingers. Look over the top of this page at a distant object. Then, without changing your eyes, lower them to the photos. If you succeed, you will see *three* pictures—a three-dimensional one in the center, two flat ones on each side.

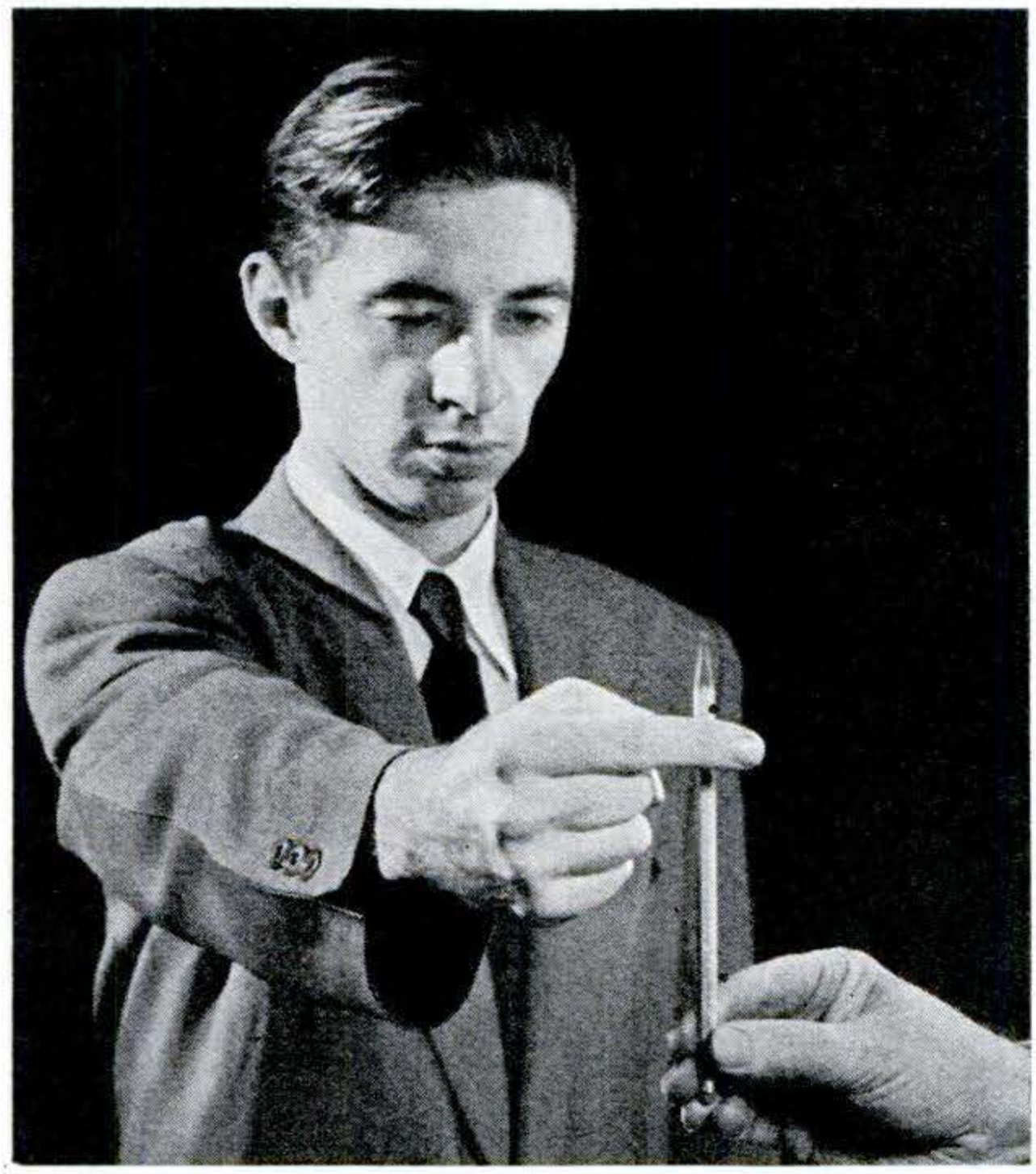


Copyrighted material

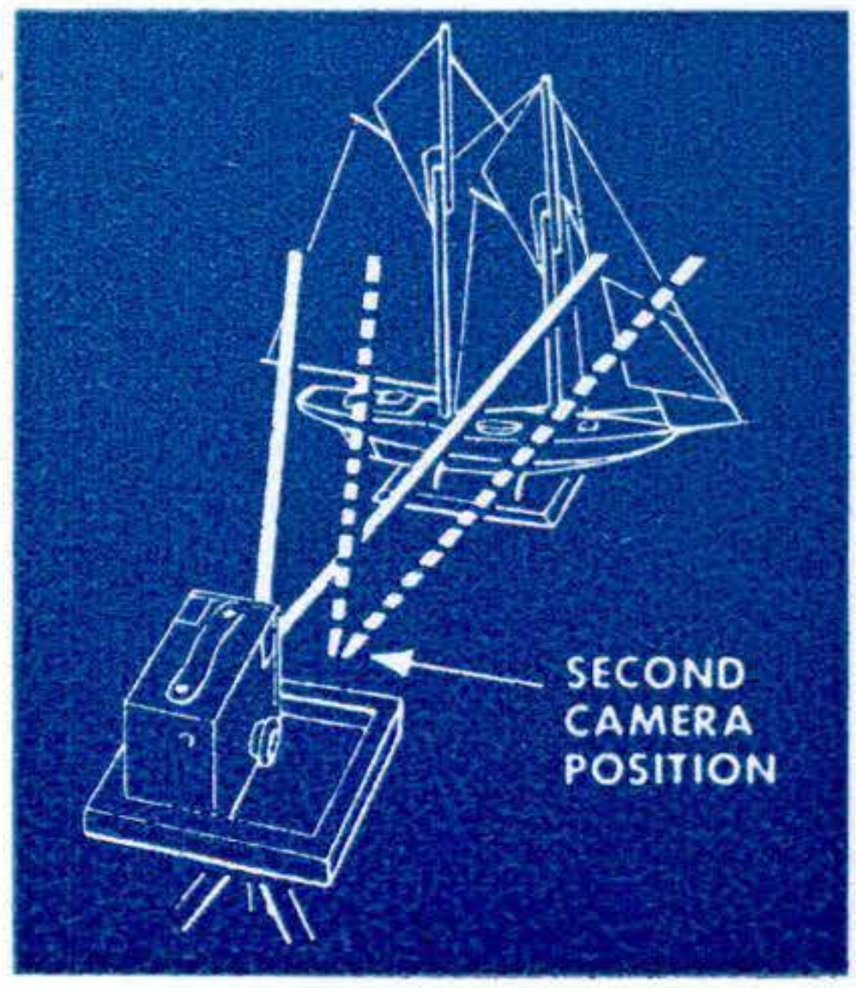





**Everybody's cross-eyed** in looking at close objects. This is a point you must remember to understand stereoscopic vision. If you look at an object more than a quarter-mile away, your eyes point straight ahead. But the closer you get, the more they converge. To see this, have a friend hold a pencil at arm's length and look at it steadily while pulling it back to his nose. Because of this convergence of vision you see things in three dimensions and are able to judge distance. Your eyes see two different views of an object. Your brain combines the two images into one that seems to have depth. A stereo viewer gives the same result when you look at a stereo pair.



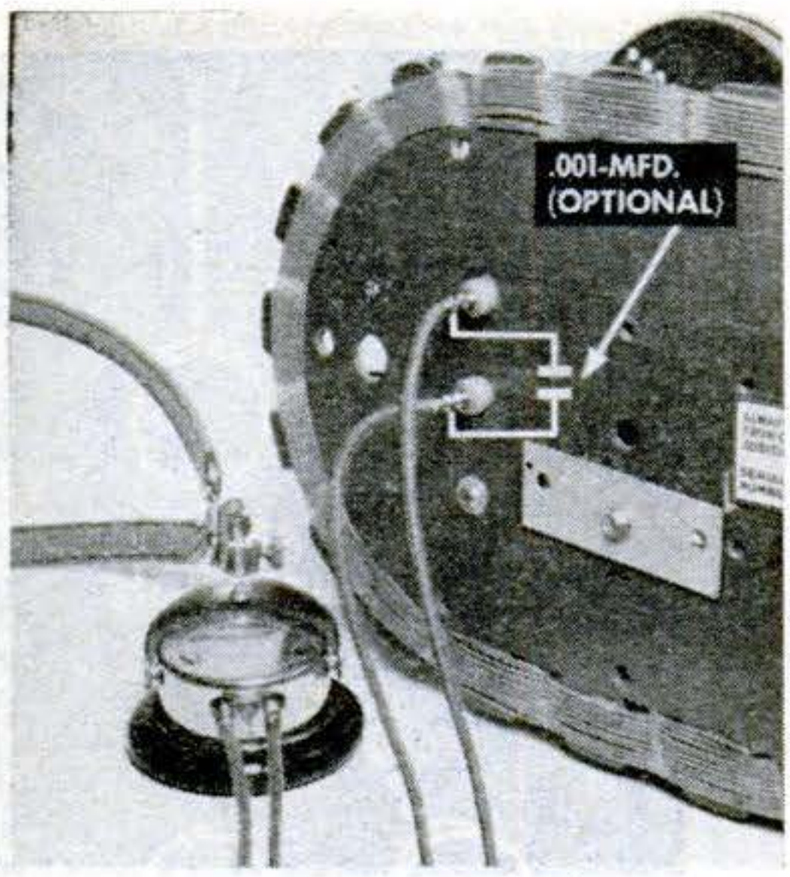
**Judging distance with one eye** is difficult because you see everything in only two dimensions—height and width. Try it and see. Have a friend hold a pencil upright. Then close one eye and, with your arm outstretched, walk toward him and try with one stab to touch the pencil from the side. If you are able to judge the distance within an inch you are better than average. Next, to see what two eyes do for you, try the same trick with both eyes open.




**You can take stereo pictures** of stationary objects with an ordinary small camera. If you object to making gadgets, just mount the camera on a tripod, take one picture, and carefully move the camera 2½" to one side and take another. The stereos on the facing page were shot this way. A wood tray like that in the sketch will make shifting the camera easier. Make contact prints of the two pictures and mount them on cardboard in the sequence they were taken. Space them so that similar points on the nearest object in the two pictures are 2½" apart. This measuring will show another difference in stereo pairs. Similar points on distant objects will be greater than 2½" apart.

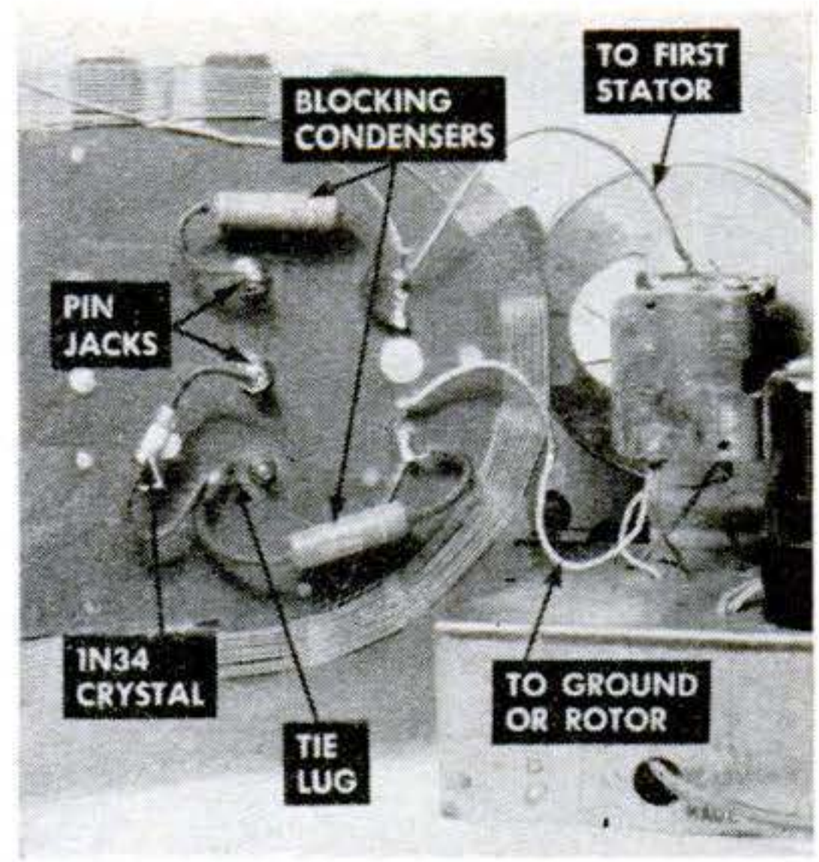


Copyrighted material




**LOCALS COME IN** with good volume on earphones, though with poor selectivity as compared to the tube circuit. Be sure to connect .001 condenser across phone tips, not jacks.

**LOOP IS GOOD PLACE** for mounting crystal-circuit parts. If the set has no loop, they can go on rear of chassis. With phones disconnected, tube reception is unaffected.

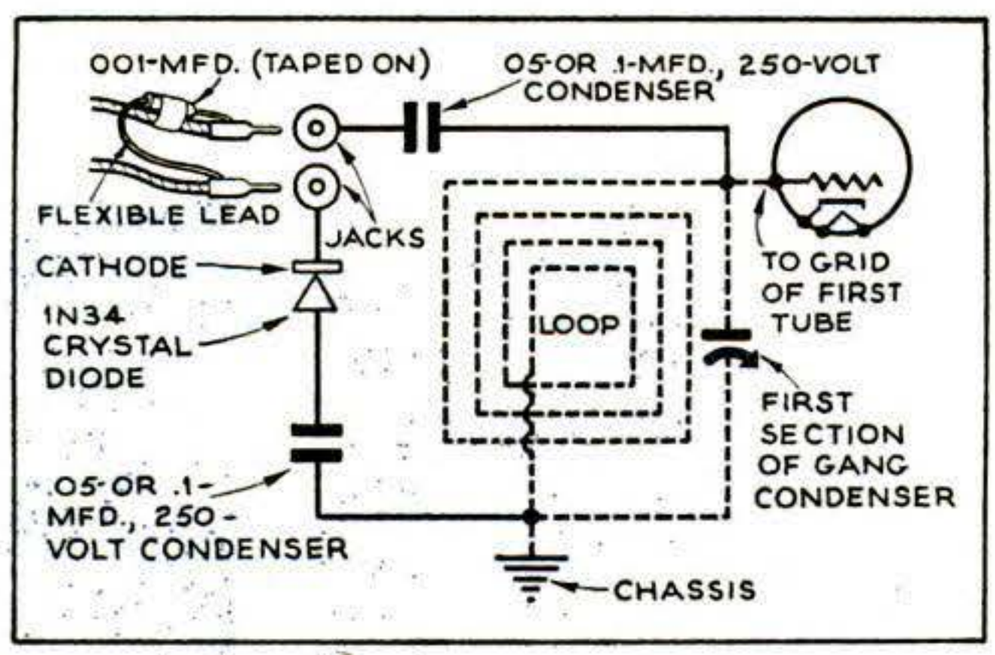



## Emergency Crystal Runs Regular Radio if House Power Fails

About a buck's worth of radio hardware adds an emergency crystal circuit to any tube radio. With it, you can get local stations on earphones even when the power line goes dead or a tube burns out on you.

If you fall asleep listening to a late program, it doesn't matter, for the crystal takes no juice and the power switch is off while it works.

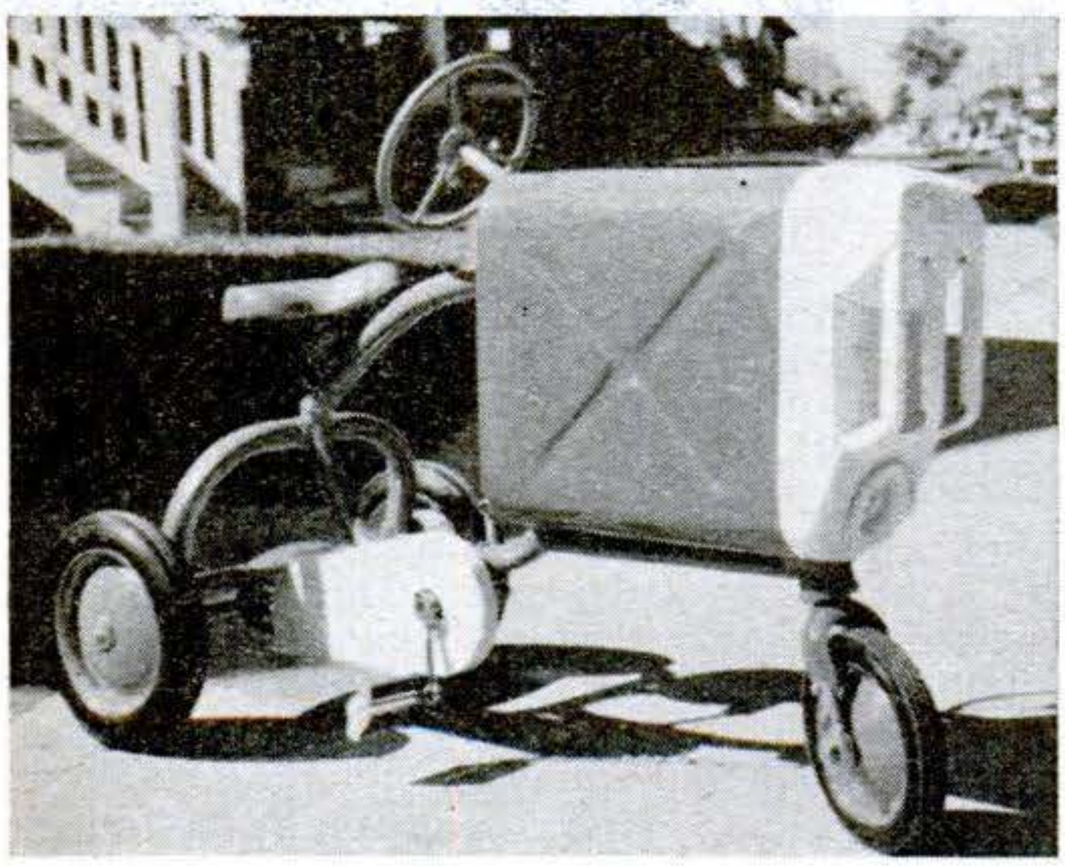
A germanium-diode crystal across the first tuned circuit does the trick. If the chassis is hot (one to which the power line is grounded), insulate the crystal circuit with two .05- or .1-mfd., 250-volt blocking condensers as shown. If the set has a power transformer to which the line cord runs, the chassis is not hot and the condensers can be omitted from the crystal emergency circuit.




Connect the diode to the chassis end of the loop (the line cord acts as antenna for the crystal circuit). If your radio has an RF coil instead of a loop, hook the circuit to the first stator of the tuning condenser and ground, trying the two leads both ways to see which works best.

A .001-mfd. condenser across the phones is optional but improves reception. To use the crystal, leave the line cord plugged in but the power switch turned off. Tune in with the regular tuning knob. If you get a hum, reverse the power plug. Disconnect the phones when using the tube radio.—*Arthur Trauffer, Council Bluffs, Iowa.*

## GI Gas Can Converted to a Realistic Toy Tractor for Youngster



Capt. Francis J. Conway of Fort Myer, Va., turned a surplus gas tank into a very workable tractor for his son.

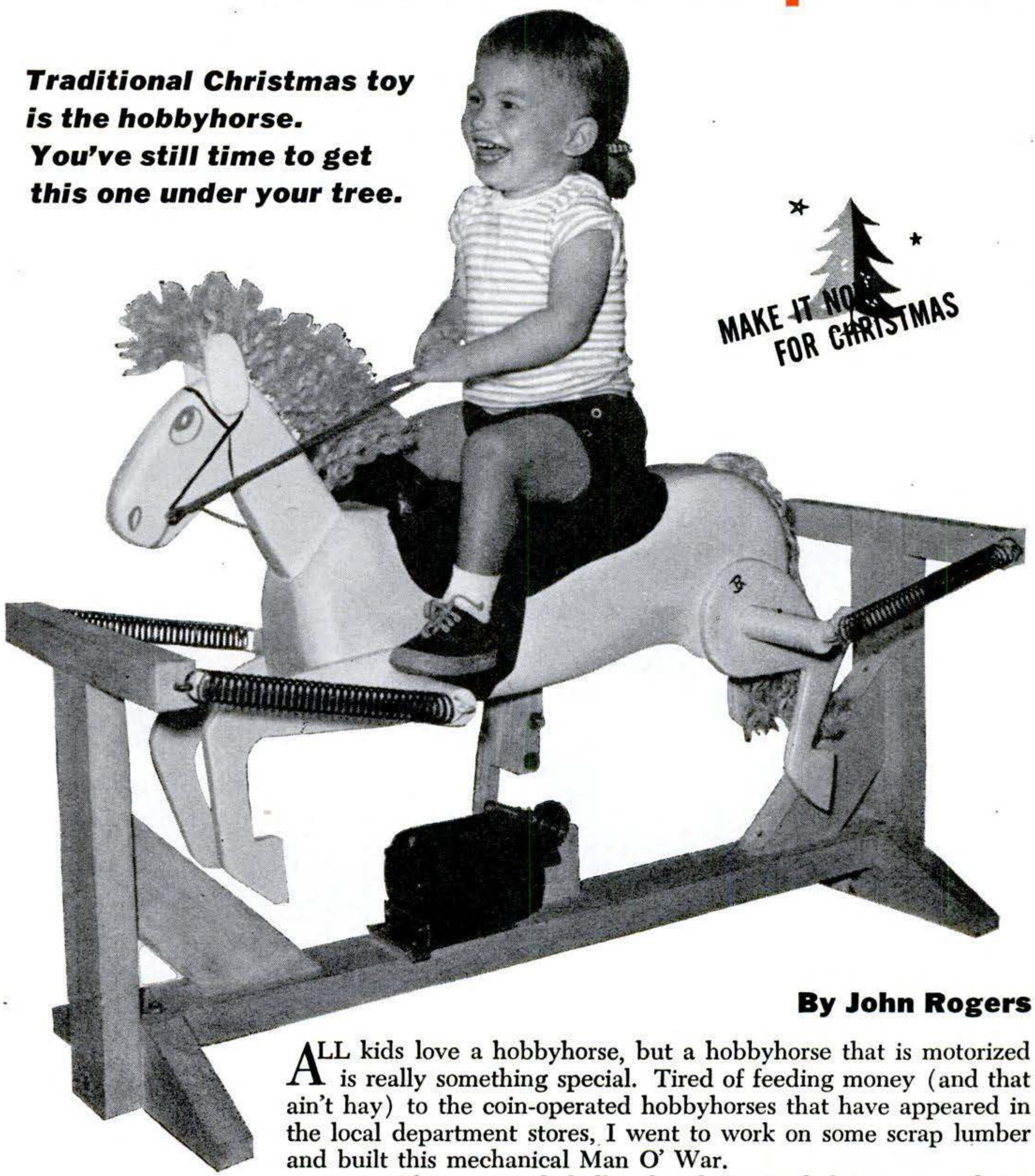
The tank, artfully welded to the rear section of a broken chain-drive tricycle, forms a realistic hood and radiator for the toy tractor. The steering wheel was built up by bending ¼" cold-rolled rod into a circle and welding the ends. Three spokes were then welded to a length of 9/16" pipe which was linked to the front steering fork through a ½"-drive socket-set universal. The gas filler hole provides access to the universal for installation and oiling.



Copyrighted material

# Hobbyhorse Runs on 1/10th Horsepower

***Traditional Christmas toy is the hobbyhorse. You've still time to get this one under your tree.***




**By John Rogers**

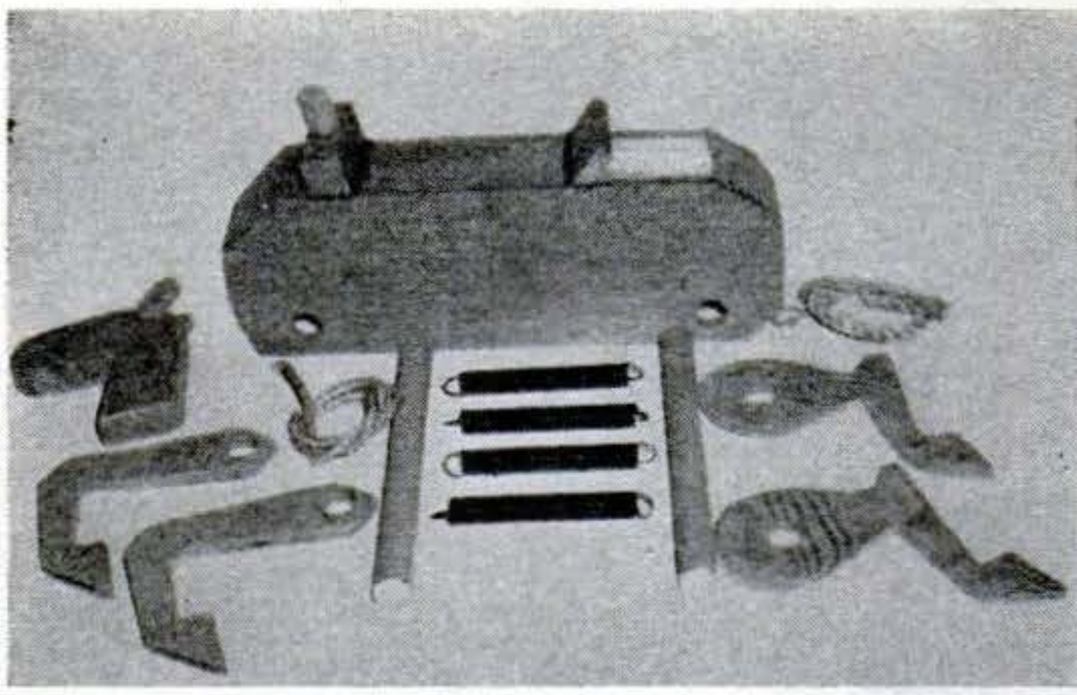
ALL kids love a hobbyhorse, but a hobbyhorse that is motorized is really something special. Tired of feeding money (and that ain't hay) to the coin-operated hobbyhorses that have appeared in the local department stores, I went to work on some scrap lumber and built this mechanical Man O' War.

***Body.*** This was made hollow by gluing ¾" shelving over a three-sided frame of two-by-fours. Blocks were glued on top for carving the saddle. Lengths of 1⅜"-diameter clothes pole 18" long were glued into holes in the sides at front and rear for the springs.

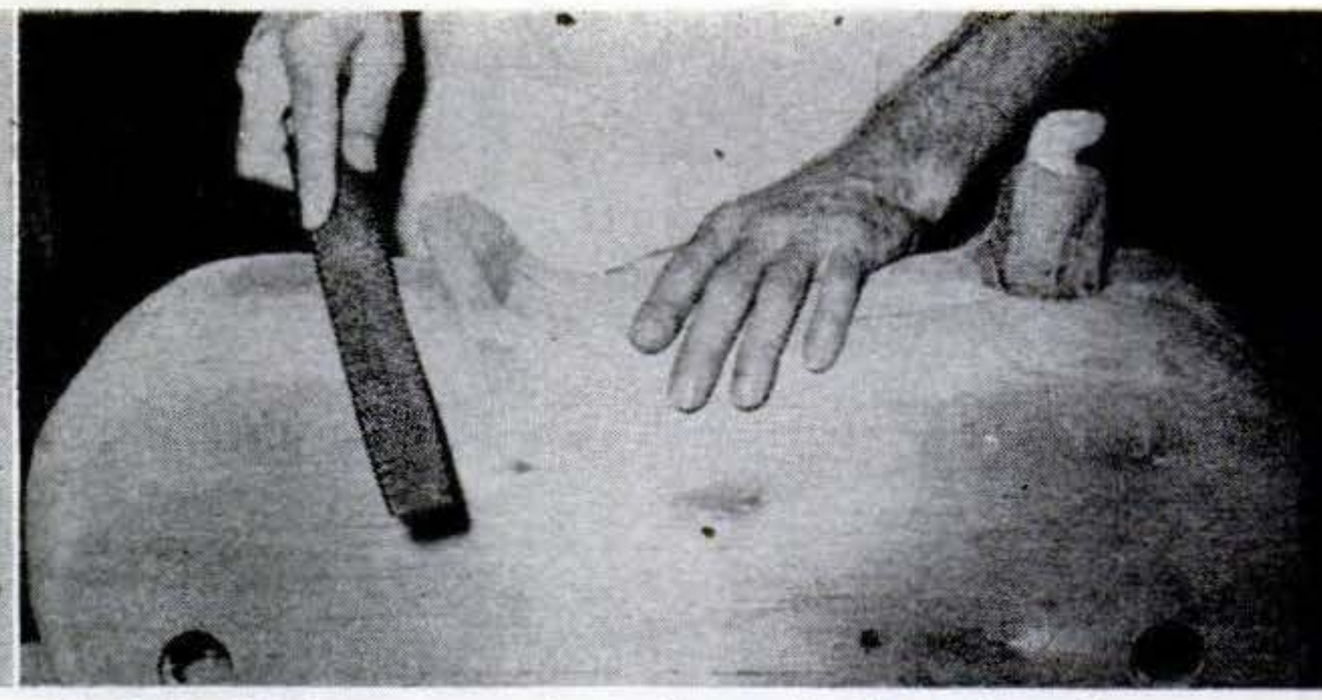
***Head and legs.*** The head was cut from a piece of 2" by 8" pine, with all edges except the one joining the body rounded. Two



Copyrighted material



**PARTS** cut from scrap lumber and pieces of plywood make legs, head and body of horse. The 1″-diameter springs were shortened to about 4″ for proper tension.



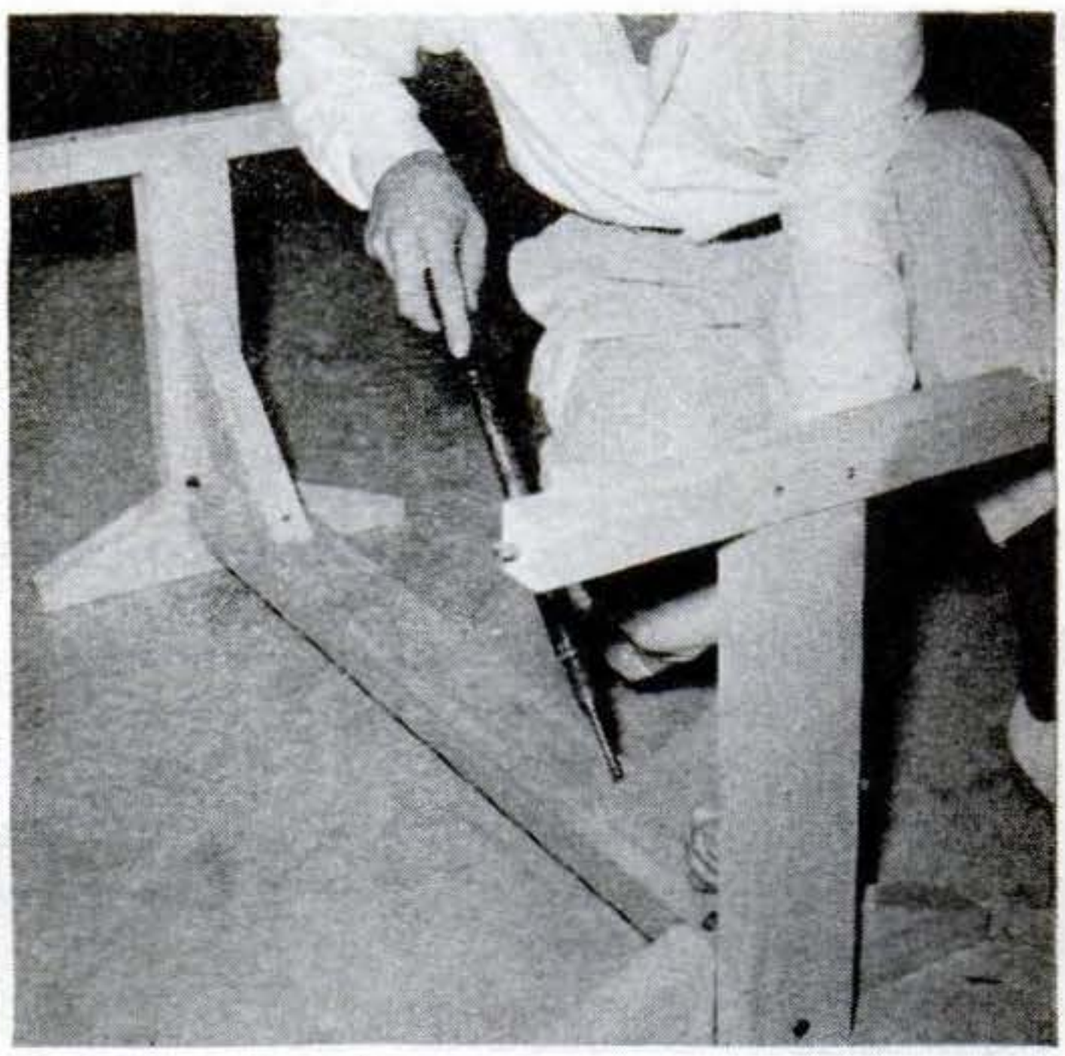
**WOOD RASP** was used to shape body and saddle, but roughing out can be done with chisel. Outline of saddle skirt is made by cutting V groove with sharp-pointed knife or chisel.

¼″ plywood tabs were used for ears. The legs were cut from scraps of ¾″ plywood and drilled to fit over the spring-hanger poles.

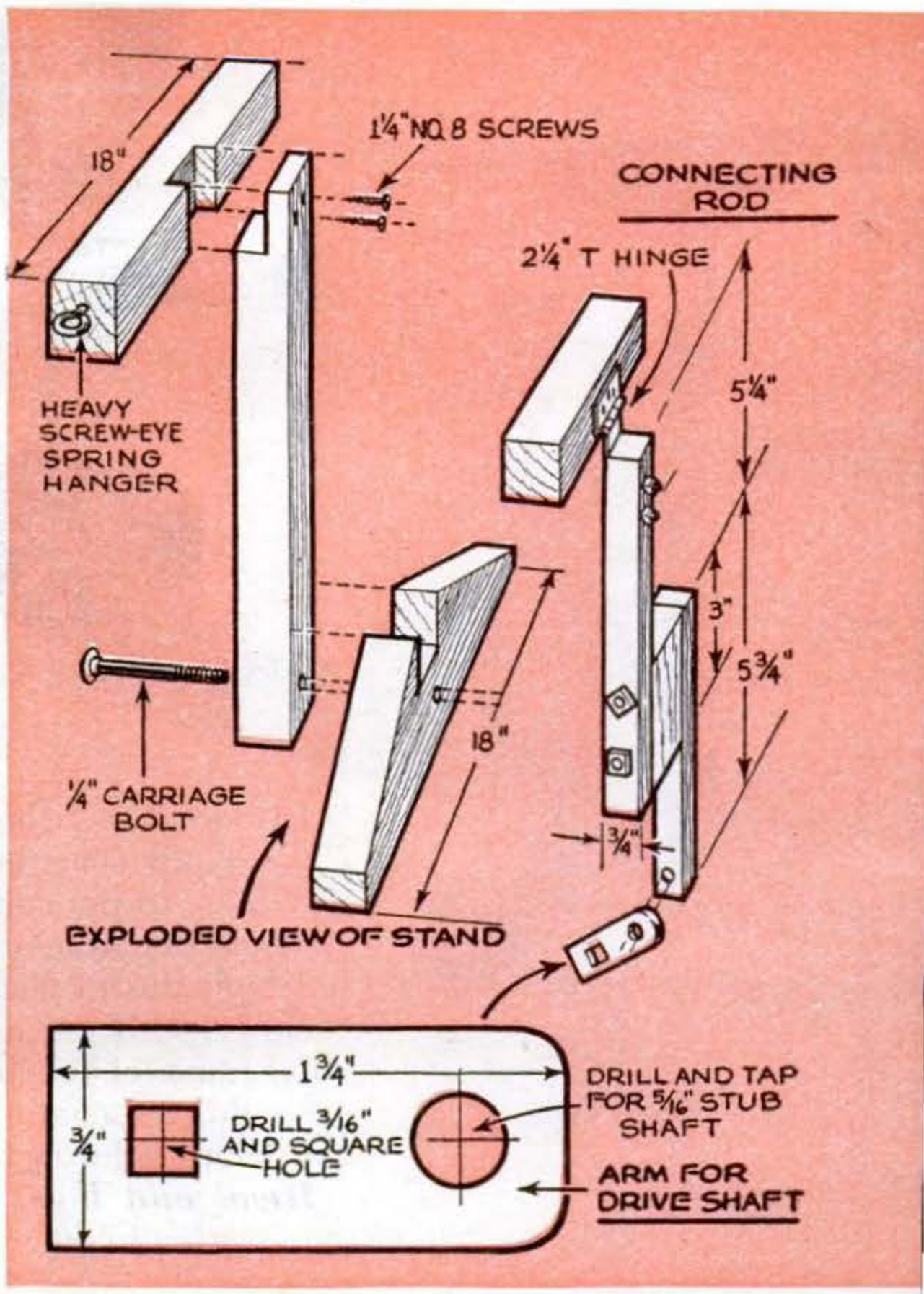
***Stand.*** This was sturdily constructed from lengths of two-by-four joined with ¼″ carriage bolts. Heavy screw eyes on the stand and at the ends of the spring hangers connect the 1″-diameter springs to support the horse.

***Motor and gearing.*** A 1/10-hp. motor was ample for the simple up-and-down motion. I selected the gears from the catalogue of the Boston Gear Works (Quincy 71, Mass.) to effect a 15-to-1 reduction in the 1,500-r.p.m. motor speed. The worm on the motor shaft (Boston No. HDVH) turns the worm gear (No. D1143) on a 5/16″ drill-rod shaft. This shaft is supported by a pillow-block bearing (No. PPB6) set on a wood block of suitable height to bring the gears in mesh.

***Eccentric arm and con rod.*** The eccentric arm was cut from a length of ¼″ by ¾″ mild steel. One hole was drilled and filed square to fit the squared-off end of the worm-gear shaft. The other hole was drilled

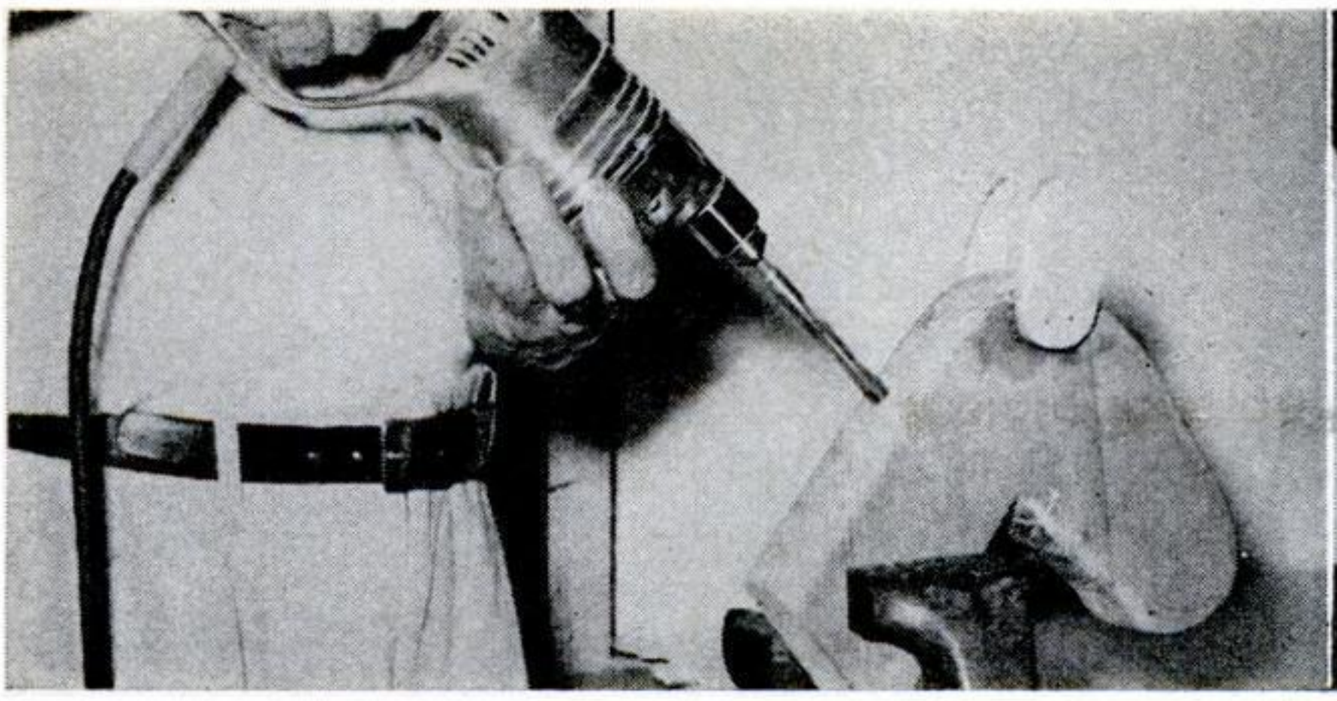


**STAND** was made sturdy to support weight of child and horse in action. Glue, screws and ¼″ carriage bolts hold it together. Screw eyes at ends of T member are for suspension springs. Corner braces keep ends vertical.

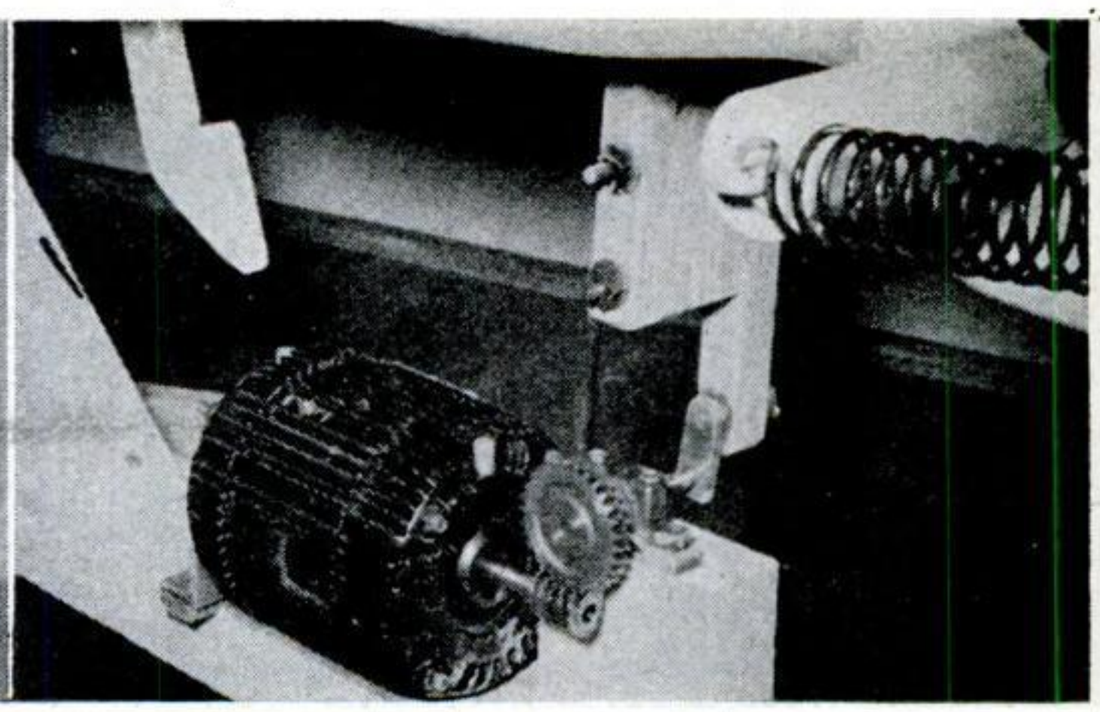





Copyrighted material



**HORSE'S HEAD,** cut from 2" by 8" pine, was drilled for hemp-rope mane. After horse was painted, rope was glued into holes and unraveled. Ears are plywood tabs.

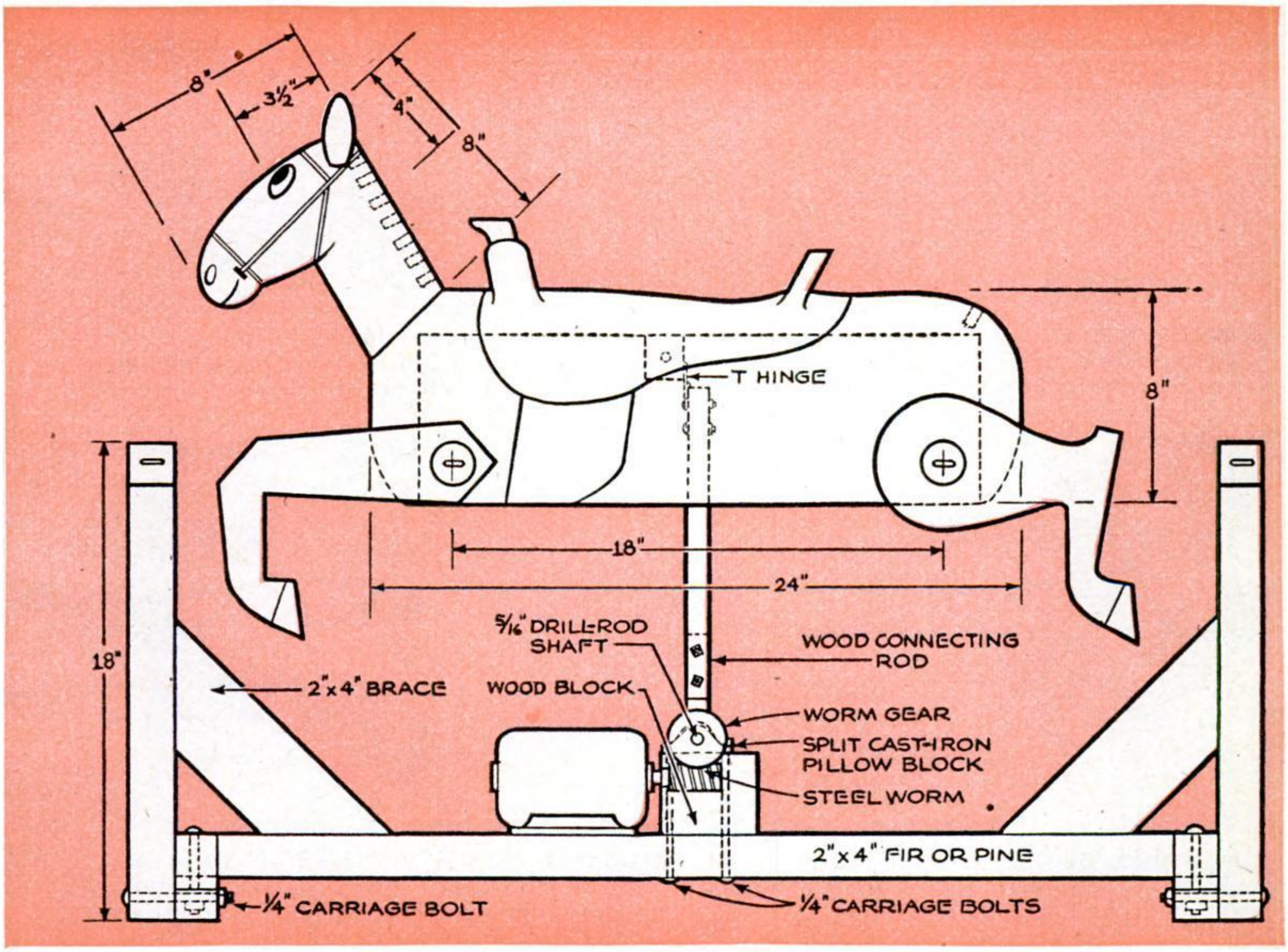


**GEAR REDUCTION** (15 to 1) reduces 1,500 r.p.m. at motor to 100 r.p.m. at the eccentric arm. If your motor runs faster, use a greater reduction. Wire-mesh guard is not shown.

and tapped for a 5/16" stub shaft to drive the connecting rod.

The wooden connecting rod was fitted with a 5/16"-inside-diameter bronze bushing to ride easily on the eccentric-arm stub shaft. A cotter pin inserted in a hole in the shaft holds the assembly together. The upper end of the con rod was screwed to a T hinge mounted on a wood block up inside the horse's body. Although it was removed for the pictures, a hardware-cloth guard installed over the gears protects the fingers of the little equestrian.

***Finishing up.*** I applied flat white paint to the stand and wiped it off to give a limed effect. The horse was enameled white. The saddle was painted burgundy, the eyes and mouth blue, the bridle black. END






Copyrighted material

How to

# Tame Balky Flashlights

***You needn't throw away a flashlight that doesn't work. Probably all it needs is a simple fix-it job.***

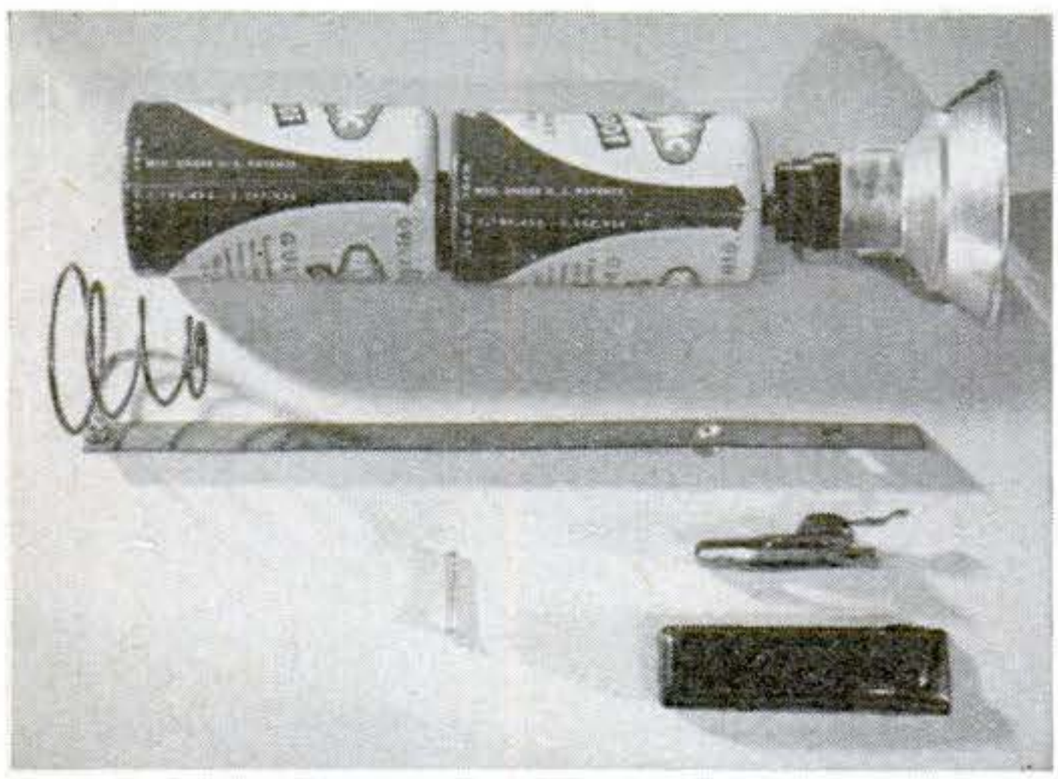
BREATHES there a flashlight with soul so dead it has never acted up on you? Favorite tricks of these miscreant flashlights are: 1. total darkness, even with good cells and bulb; 2. a tendency to give off light like a tired glowworm; 3. a willingness to work only when held at a 22° angle or when given two smart raps in the full of the moon.

Fortunately these sly tricks can be disciplined with the repair dodges shown in the photos. Your first step is to determine if the flashlight has an electrical switch or a mechanical switch. In the latter case, a metal strip is moved forward until it rams the side of the reflector cone.

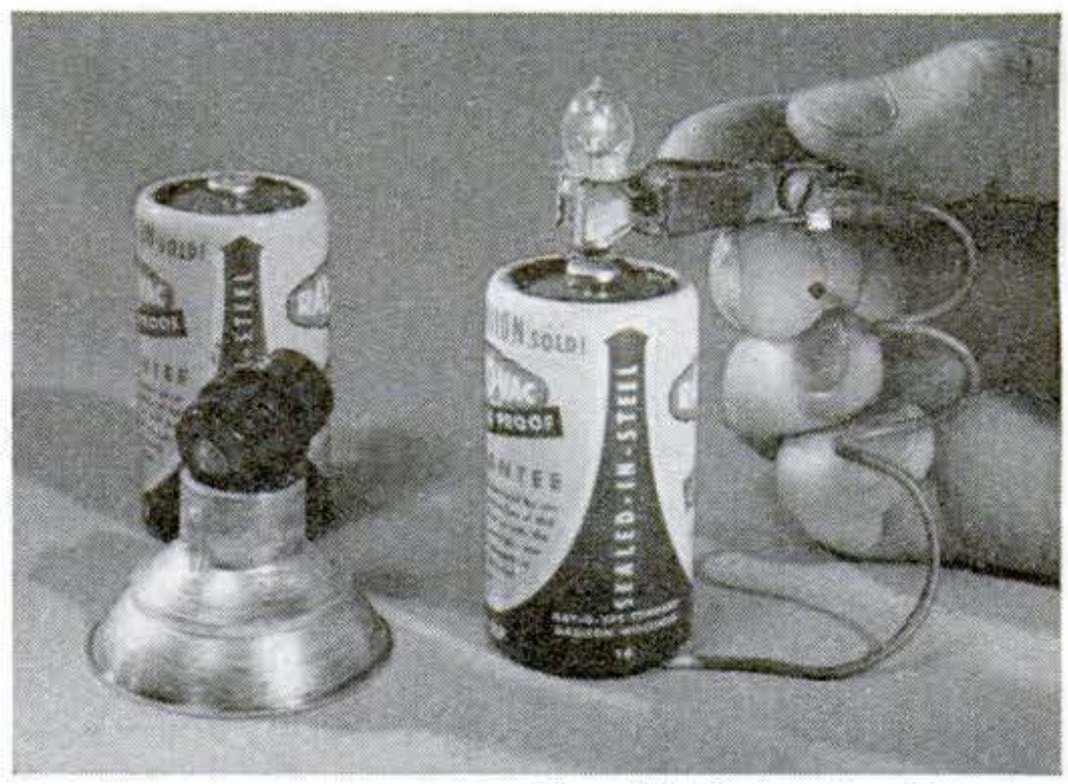
A defective electrical switch can be removed by drilling or chiseling out the holding rivets. When the time comes to replace it, a vise-held piece of pipe will make an anvil to rivet against.

If the trouble seems to center in a mechanical switch, check first to be sure the reflector cone is electrically separated from a metal case.

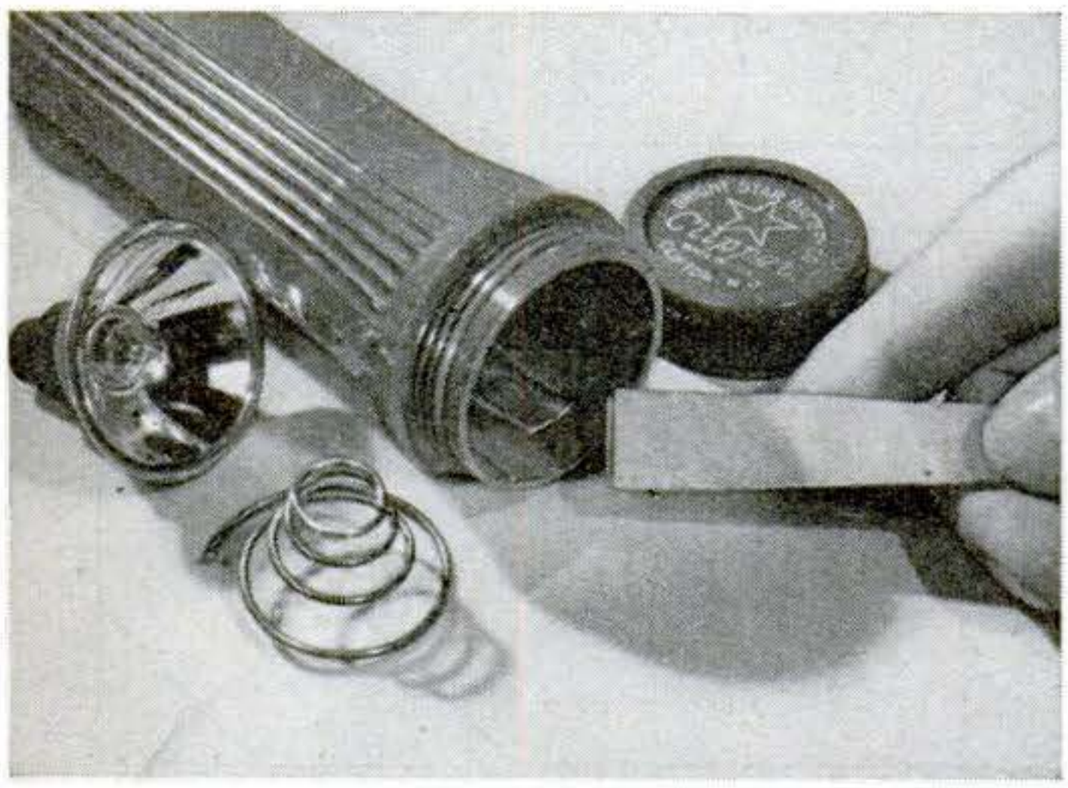
Servicing a water- or explosion-proof flashlight should also include inspection of the gaskets. If a light has a defective gasket or cracked lens, don't use it in a gasoline-vapor or other explosive atmosphere.—*Ken Murray, Colon, Mich.*



**ELECTRIC CIRCUIT** of common type of flashlight is shown above. Button moves metal strip to touch reflector shell, lighting bulb.



**BULB AND BATTERIES** should be tested first. With circuit bridged, 2.4-volt bulb should glow. If not, bulb or battery is defective.

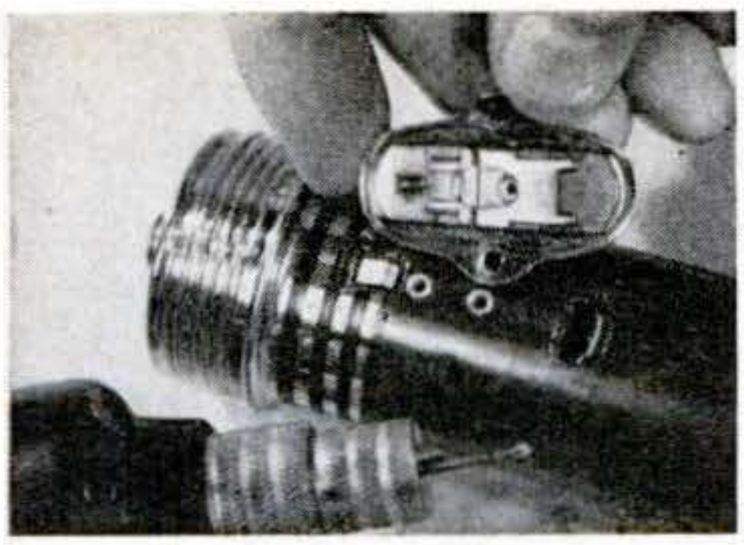


**CAP SPRING,** outside of bulb reflector and end of brass contact strip can be cleaned with sandpaper or an emery board.

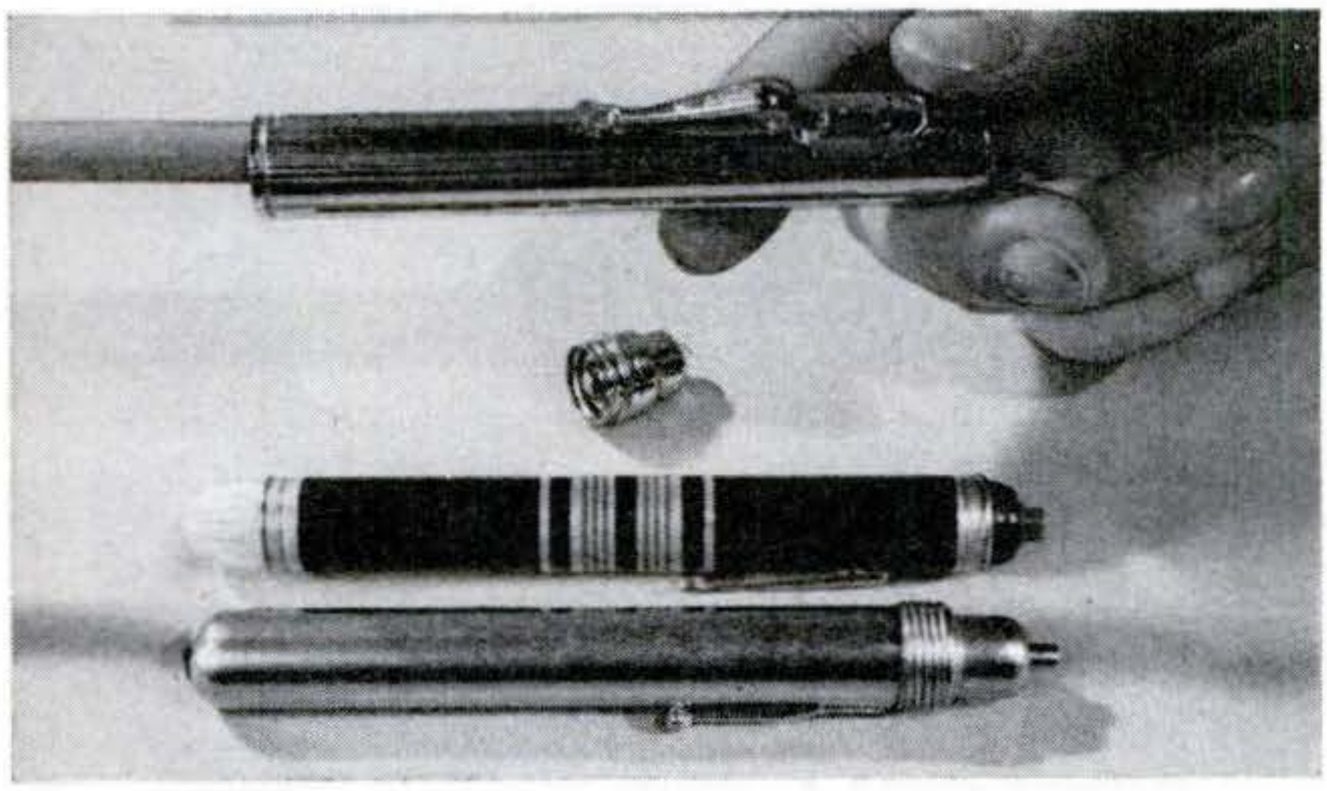
**ALLIGATOR CLIPS** on each end of circuit can test electrical-type switch in on position. If lamp doesn't glow, switch is defective.



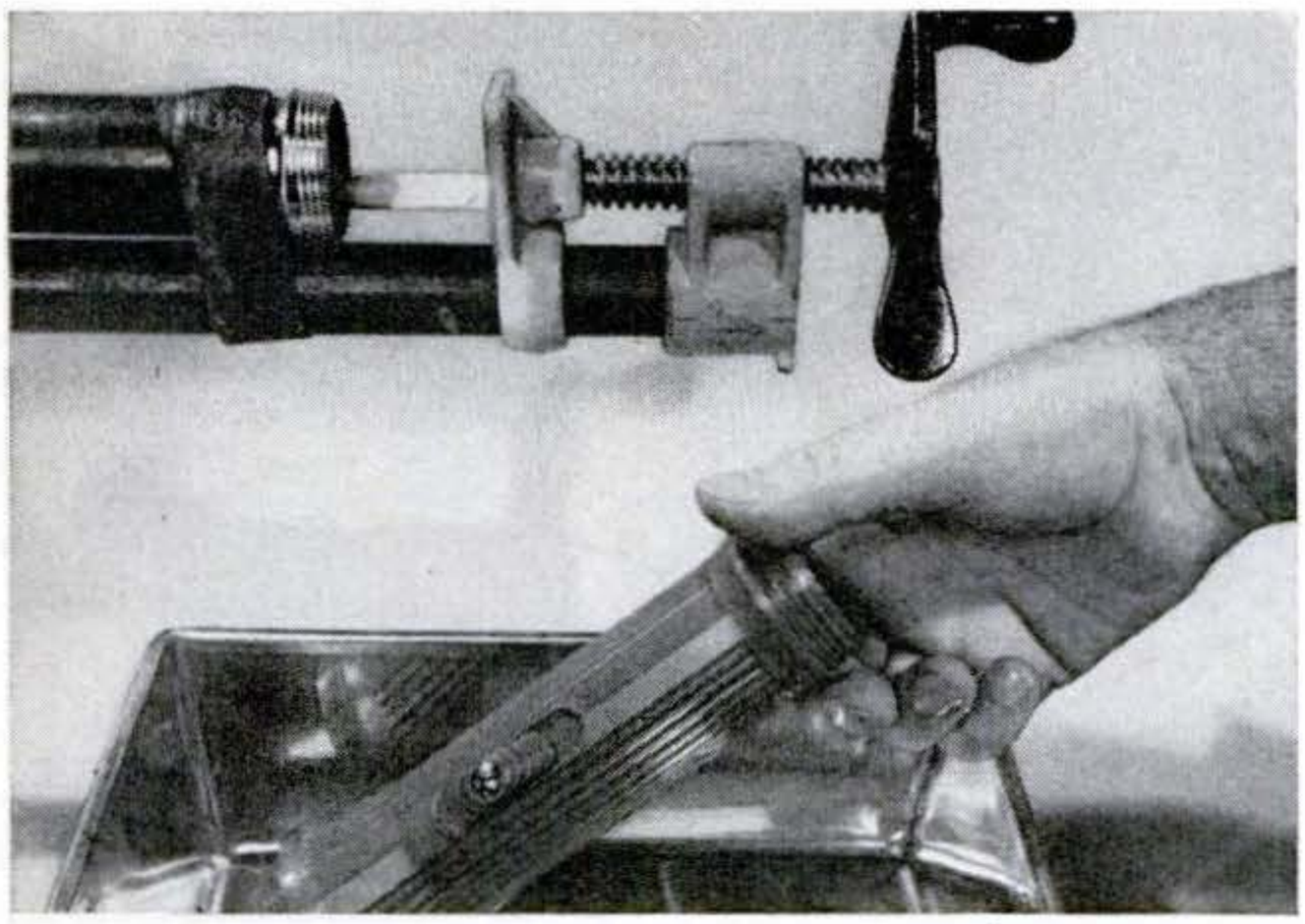
Copyrighted material



**ELECTRICAL-TYPE SWITCH** usually is a simple sliding contact spring. If spring is broken, cut another from thin spring brass.



**PENLIGHT** contacts can be cleaned with disk of sandpaper glued to end of dowel, removing corrosion that causes flickering of bulb.



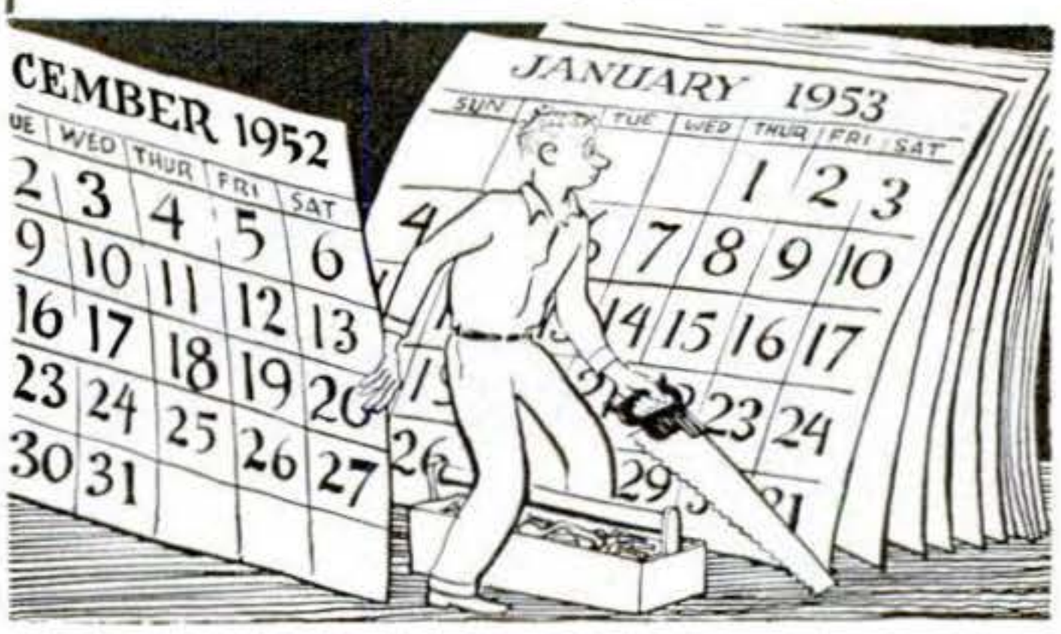
**STUCK CELLS** can be removed (top) by taping case to bar clamp. Then stick, pushed by clamp screw, shoves cells out. In plastic case, stuck batteries can be loosened by soaking case in solution of two parts ammonia and one part water.

**SCRATCHES** can be removed from plastic lens by rubbing with cream made of water and tooth powder or toothpaste.

**December** brings the first official day of winter, along with the most joyous holidays of the year. Have a very merry Christmas, but don't neglect the extra precautions of fire protection needed this month.

- Indoor heat will dry your Christmas tree to tinder, so first make it fire-resistant (see page 194), and inspect the tree lights with special care. And just to be sure, keep a recently charged fire extinguisher nearby.
- Check the fireplace and flue before burning the Yule log. Repair loose mortar, cracked brick or a defective damper. Flues should be cleaned every three to five years —more often if you burn softwood. Be careful burning wrappings and wreaths; they often start chimney fires.

- Relax and think of the months ahead. If fall preparations for winter were completed, there'll be little to do now except shovel snow and watch the gutters for ice dams. Also keep an eye out for ice-laden branches near the power and phone lines.
- Remember, the Home Handyman's Calendar is good any year, all year.






Copyrighted material

Easy-to-use materials for printing pictures—ideally suited for beginners. **Kodacraft Printing Kit, $4.95.**

Basic essentials for developing and printing pictures, including roll-film tank. **Kodacraft Photo-Lab Outfit, $8.75.**

Complete developing, printing equipment, incl. metal printer. **Kodacraft Advanced Photo-Lab, $14.10.**

For efficient print drying. Counteracts tendency of prints to curl. Use it over and over. **Kodak Blotter Roll, $2.88.**

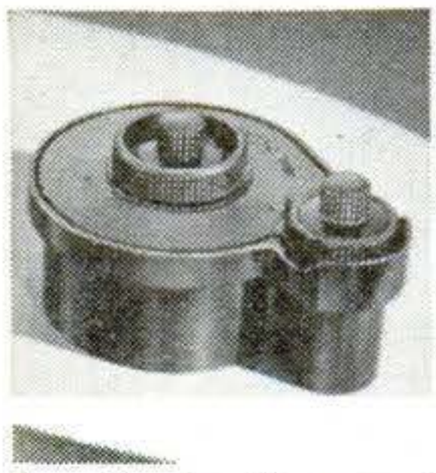
Easy to use, load, and pour. Takes 620-120, 616-116, and 127 roll films. **Kodacraft Roll-Film Tank, $2.53.**

For simultaneous development of two rolls of 828 or 135 film. **Kodacraft Miniature Roll-Film Tank, $2.53.**

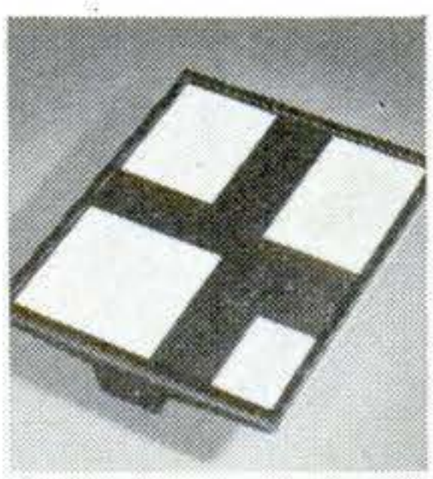
# *Save time—Shop here*

## *for the photo fans on your Christmas list*

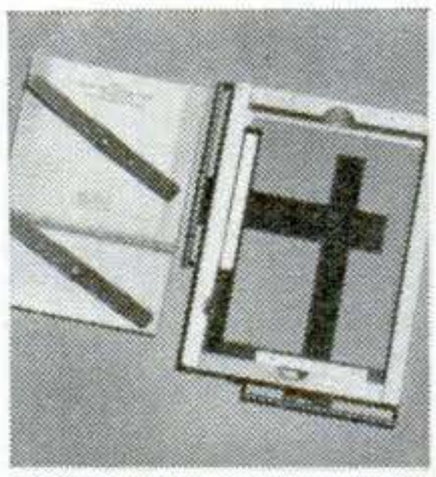
These two pages give you some idea of the many useful and inexpensive gift ideas at your photo dealer's. Visit him soon. He'll be glad to help you choose just the right gift for every photo fan on your shopping list.



Permits loading and processing of 35mm. films to be carried out in daylight. **Kodak Day-Load Tank, $9.30.**



New-type printing frame of steel construction. Includes a set of masks. **Kodacraft Printing Frame, $1.29.**



Adjustable—accepts all sizes of negatives up to 4 x 5½ inches. **Kodak Auto-Mask Printing Frame, $2.79.**

Converts ordinary tray to efficient, trouble-free washer for prints or films. **Kodak Automatic Tray Siphon, $4.50.**

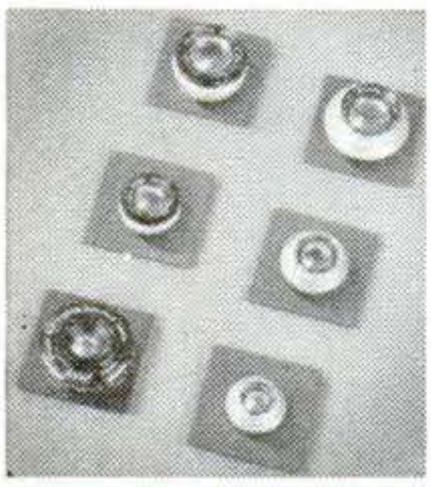
Frees both hands for handling equipment and material in the darkroom. **Kodak Utility Footswitch, $10.00.**

Tilting base, minute and split-second hands, large dial. Covers intervals to 60 minutes. **Kodak Timer, $7.20.**

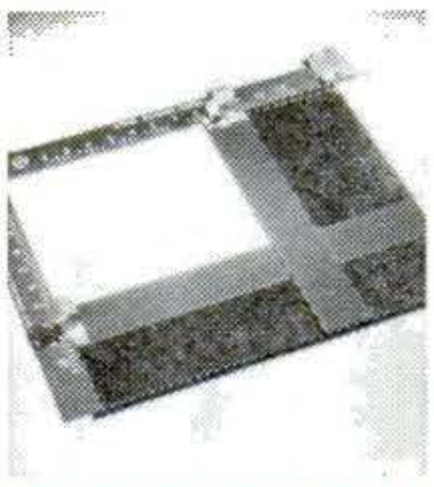
Gives precise timing in contact and projection printing, 1 to 57 seconds. **Kodak Electric Time Control, $13.50.**

Handsome chemical-resistant plastic housing protects all working parts. **Kodak Chemical Scales, $9.90.**

Cool, Circline fluorescent lamp, integrating-sphere lamphouse are prominent features in each enlarger. **Kodak Hobbyist Enlarger** *(left)*, **$44.00,** complete with *f*/6.3 lens. Versatile **Kodak Flurolite Enlarger** *(right)*, **$99.50,** without lens.

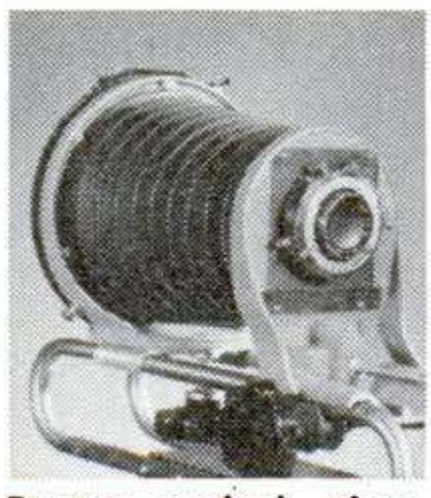


Lenses for the Flurolite Enlarger range from **50mm. f/4.5 "Ektanon"** to **4-inch f/4.5 "Ektar."** From **$14.00.**

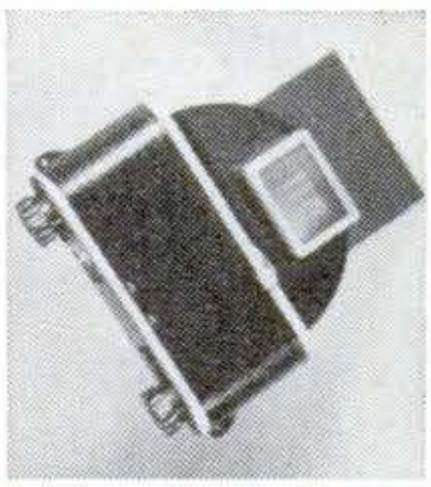


For accurate masking of enlargements—use it with any vertical enlarger. **Kodak Masking Easel, 11 x 14, $9.60.**

For determining correct printing time—saves both paper and time. **Kodak Projection Print Scale, $1.15.**



Feature-packed view-type camera—permits one-to-one close-ups. **Kodak Flurolite Camera Combination, $60.00.**



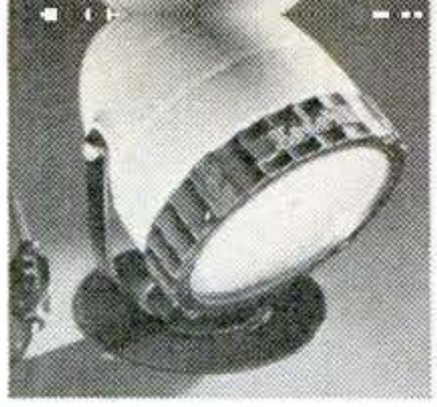
Permits use of 35mm. film with Flurolite Enlarger or Recomar-type cameras. **Kodak 35mm. Film Adapter A, $45.00.**

Copyrighted material

Includes three cups for darkroom work with both papers and films. **Brownie Darkroom Lamp Kit, $1.75.**

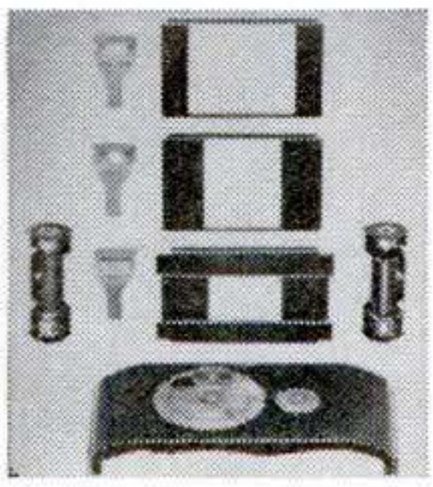
New darkroom safelight that provides direct or indirect illumination—or both. **Kodak 2-Way Safelamp, $4.50.**

Can be used either from a drop cord or in a wall plug. Includes safelight filter. **Kodak Darkroom Lamp, $4.70.**



Attaches to wall, shelf, bench. Includes switch, cord, safelight filter. **Kodak Adjustable Safelight Lamp, $7.40.**

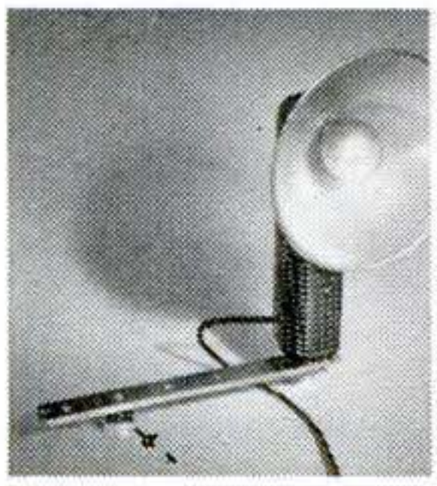
Expertly made, offers sound protection together with smart appearance. **Kodak carrying case.** From $2.65.



Adapts de luxe model Kodak Tourist Cameras to take Kodachrome Film. **Kodak Tourist Adapter Kit, $13.25.**

Permits use of economical Bantam-size (828) color films. **Kodak 828 Adapter for Kodak Reflex Cameras, $4.59.**

Automatically trips shutter, permits photographer to get into picture. **Kodak Auto-Release, $3.86.**



Provides dependable "flash" for most internally synchronized cameras. **Kodak Standard Flasholder, $8.25.**

Sensational new battery-condenser flash system. **Kodak Ektalux Flasholder** (Standard Bracket), **$29.75.**

Condenser-type power for dependable "flash." **Kodak B-C Flashpack,** $2.95 (without 22½-volt battery).

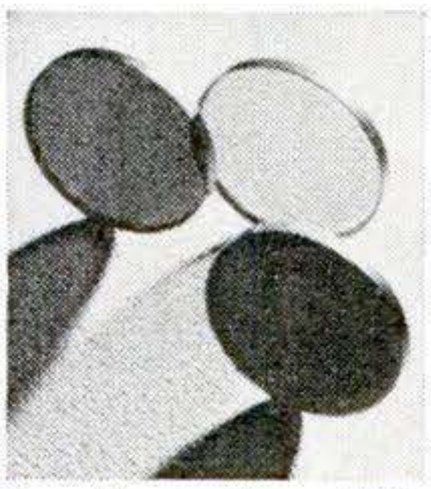
Twelve-inch reflector focuses readily from wide to narrow light beam. **Kodak Vari-Beam Clamplight, $10.50.**

Permits close-range picture taking with most fixed-focus cameras. **Kodak Close-up Attachment, $1.63.**

Now a filter designed for inexpensive box cameras—emphasizes clouds. **Kodak Cloud Filter, $1.72.**

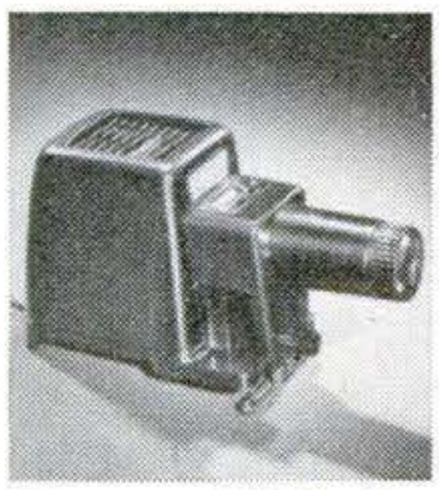
Provides an excellent means of darkening the sky and clouds in color pictures. **Kodak Pola-Screen, $6.75.**

Shades the camera lens and reduces sky flare—attaches directly to adapter ring. **Kodak Lens Hood.** From $1.65.



Popular yellow (K2), red (A), and green (X1) filters to fit most cameras. **Kodak Wratten Filters.** From $1.65.

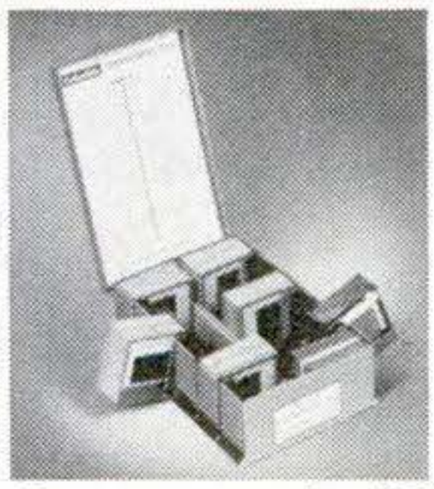
Two compartments hold 4 filters, adapter ring, lens hood. **Kodak Combination Filter Cases,** $4.25, $4.95.



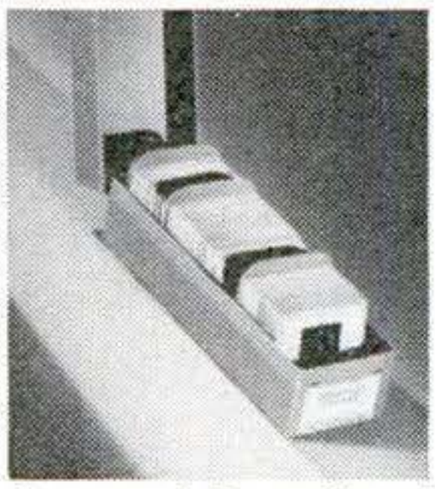
New-type slide-feeding mechanism, cool operation, elevating device. **Kodaslide Merit Projector, $26.10.**

2 x 2 projector and screen in a single unit. Usable in fully lighted room. **Kodaslide Table Viewer, 4X, $49.50.**

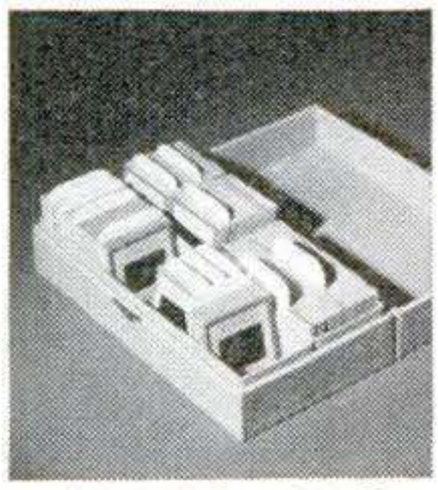
Projector, screen, slide changer in one unit. **Kodaslide Table Viewer, Model A, $97.50.**



Compartments for 240 cardboard or 96 glass slides. **Kodaslide Compartment File, $3.94.**



Protects 140 cardboard or 55 glass slides—keeps them organized. **Kodaslide File Box, $1.57.**



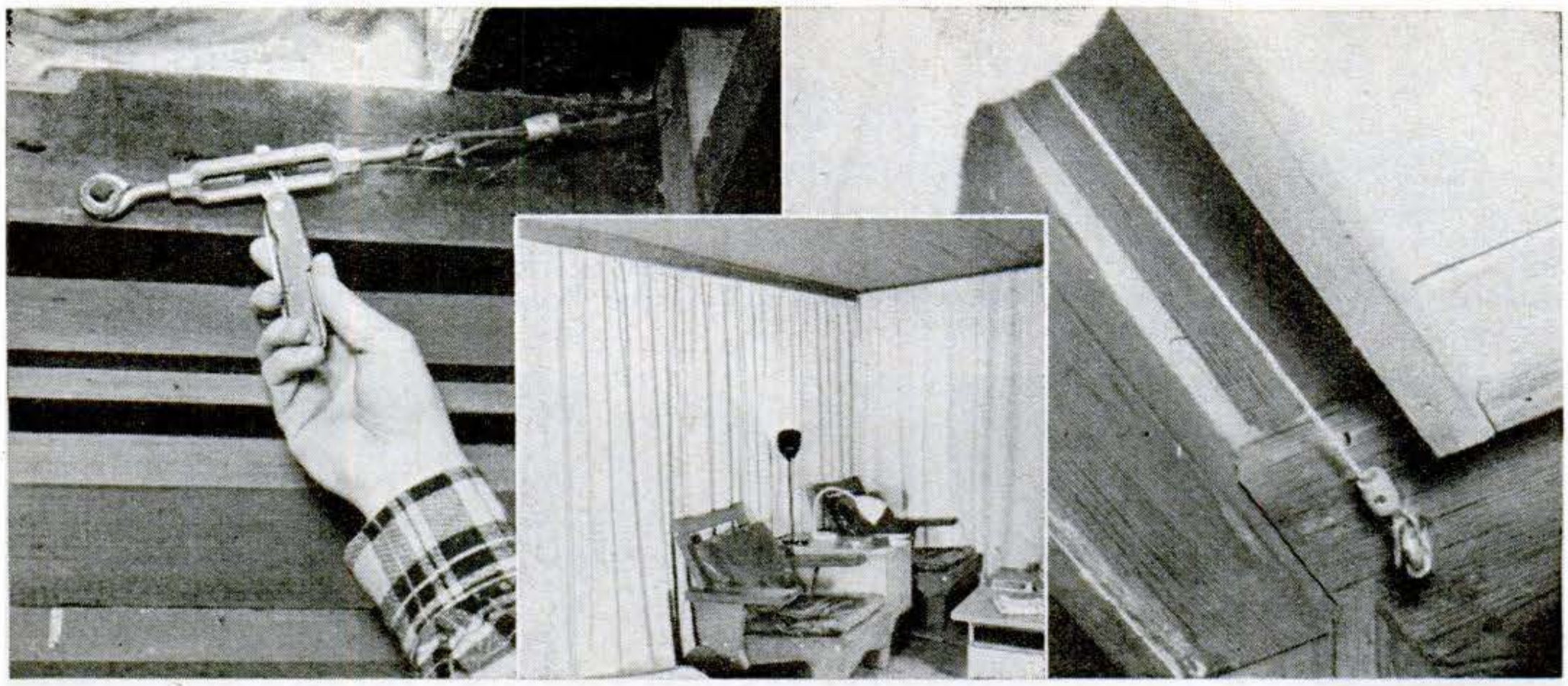
Holds 360 2 x 2-inch or 160 stereo slides. **Kodaslide Flexo File, $1.25.**

***Prices subject to change without notice and include Federal Tax where applicable. Consult your dealer.***

**EASTMAN KODAK COMPANY, ROCHESTER 4, N. Y.**

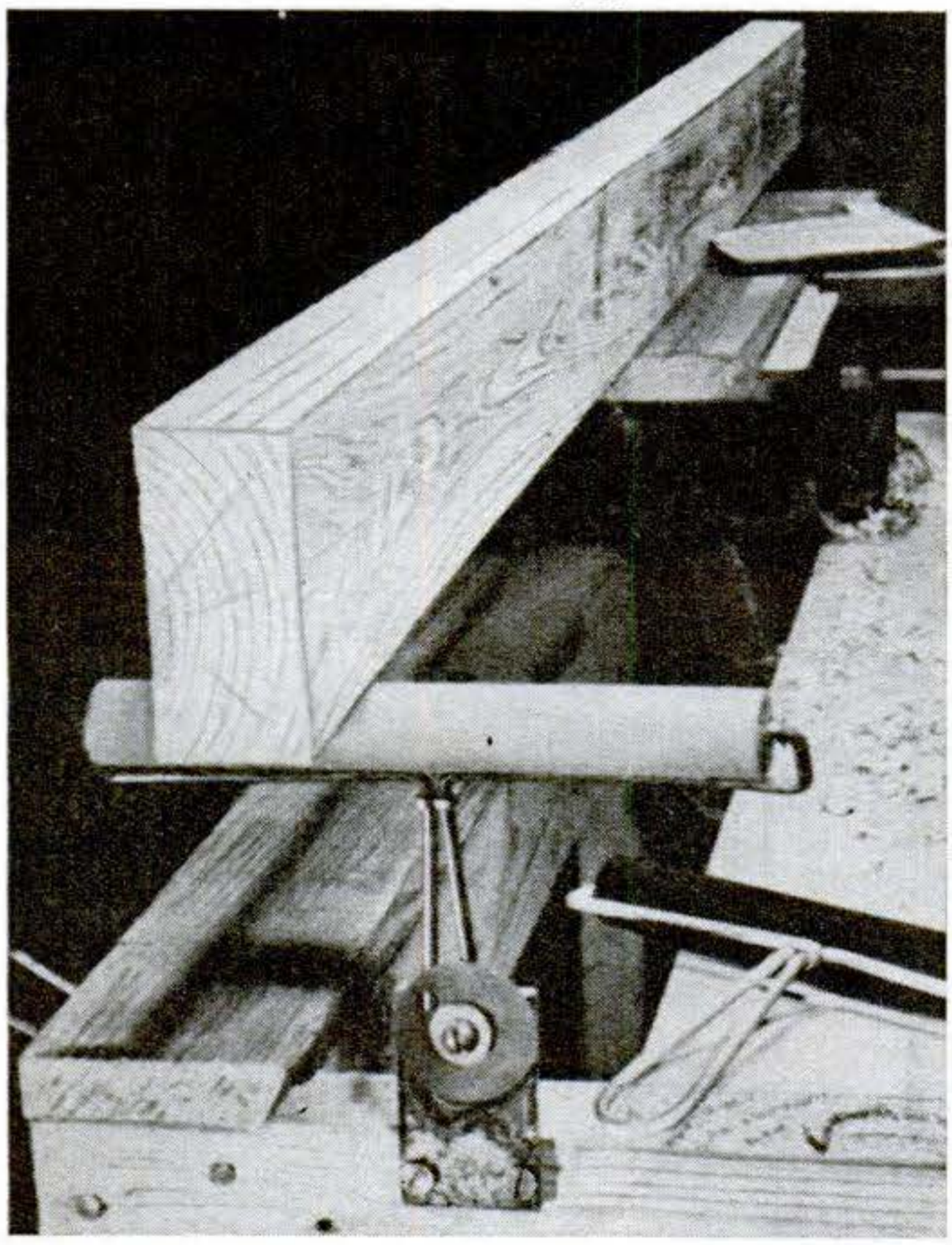
**Kodak**
TRADE-MARK

## Curtain for Big Picture Window Hung on Surplus Aircraft Cable



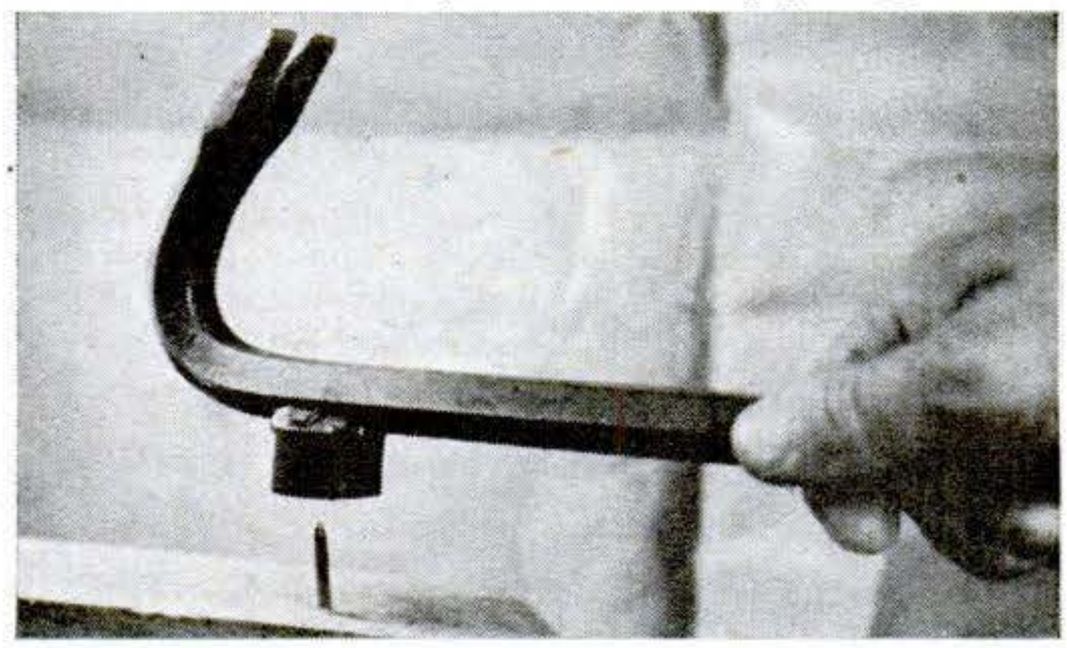
WIDE curtains—for a picture window, a wall or a row of windows on a sun porch—can be hung conveniently on a taut steel cable. The cable I used was aircraft control cable that I bought at a surplus store. A big screw hook and a cable connector, as shown in photo at right above, hold the cable to the wall at one end. A turnbuckle at the other end lets you tighten the cable. If the curtain covers a big wall, you may have to put another hook in the center as a support. With the cable in place, hang the curtain with standard hooks.—*Darrell Huff, Sonoma, Calif.*

## Roller Is Jointer Support



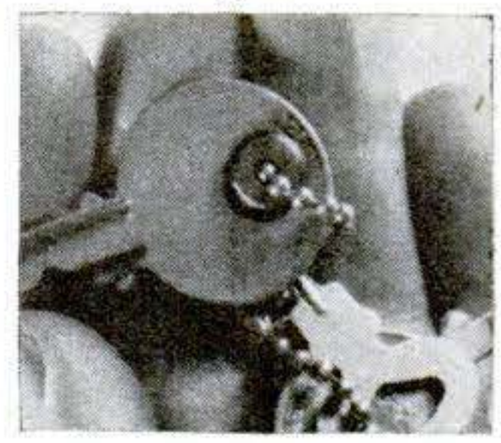
AN OUTBOARD support for a jointer or a circular saw can be made with a photoprint roller. Line up the roller with the rear table of the jointer or the table of the saw. Use an accurate straightedge for this job.—*Harry L. Truchelut, Atlanta, Ga.*

## Steel Pad Improves Ripping Bar



HAVE a piece of cold-rolled steel 1¼″ in diameter and ¾″ thick welded to your ripping bar. Then the bar will serve as a hammer to back out nails until the head can be grabbed with the claw.—*Earl R. Nearhood, Colorado Springs, Colo.*

## Grommet Separates Keys

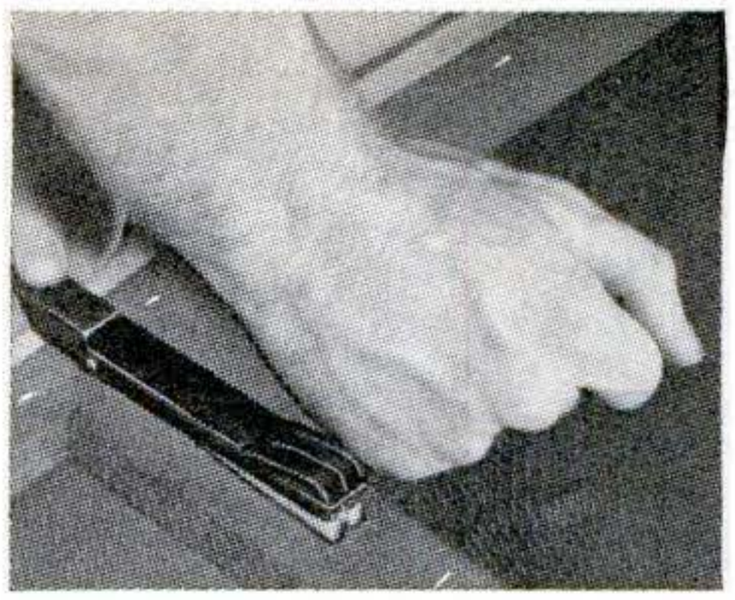


FOR fast location of that much-used key among others on a chain, use a small rubber grommet. The grommet keeps the key spaced from the others and makes identification easy even in the dark.—*Andrew Brennan, Philadelphia.*

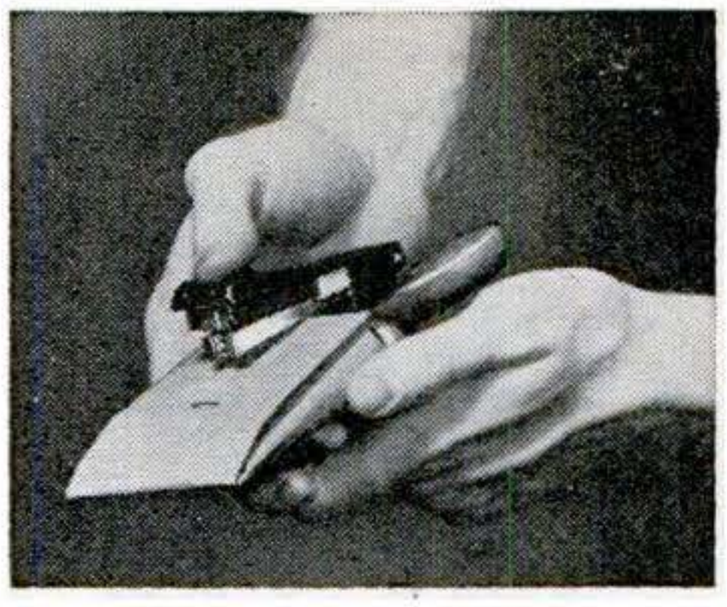


Copyrighted material

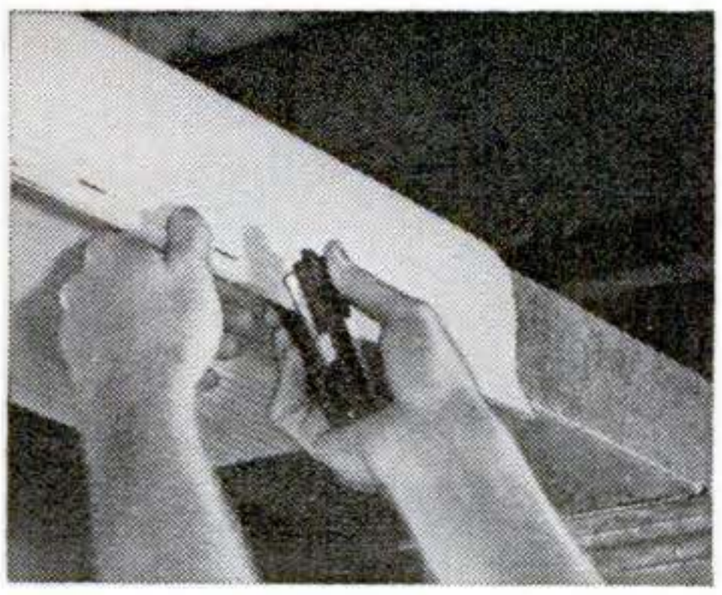
# FASTEN IT FASTER



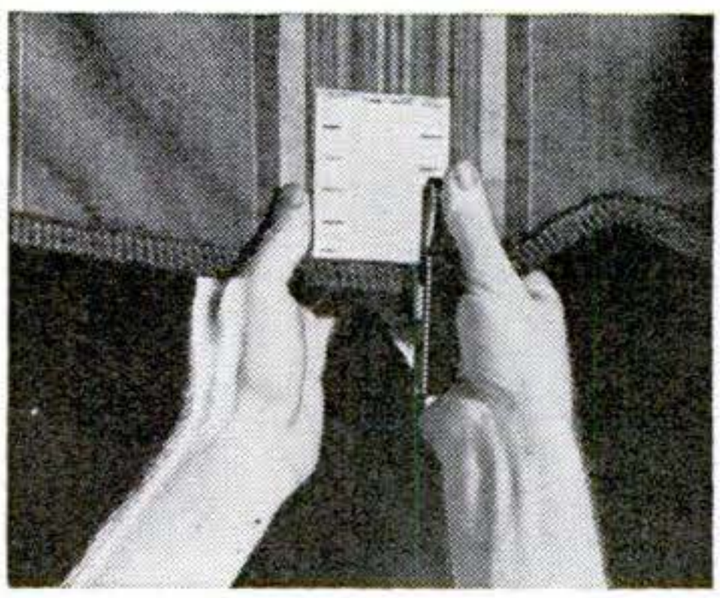
**PLASTIC SCREENING** can be tacked to frames quickly and easily with *Bostitch B-8* used as tacker.



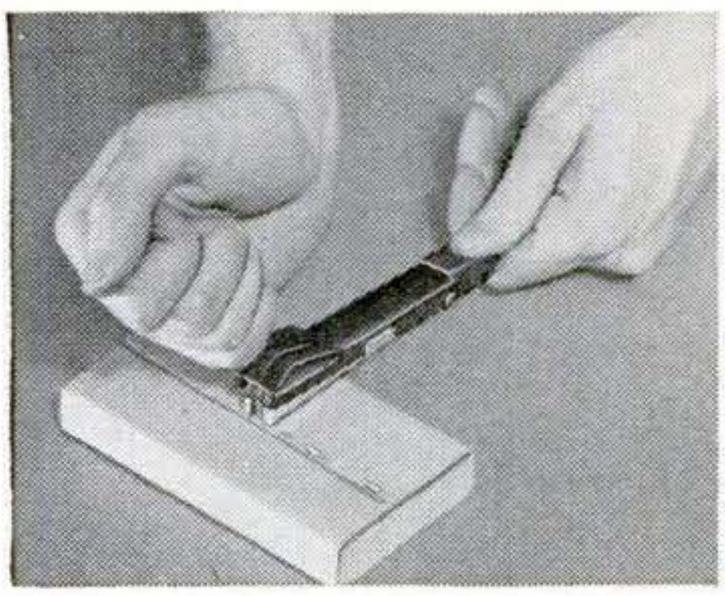
**PUT WRAPS** on your paint brushes between jobs. *Bostitch B-8* has removable base for getting into tight places.



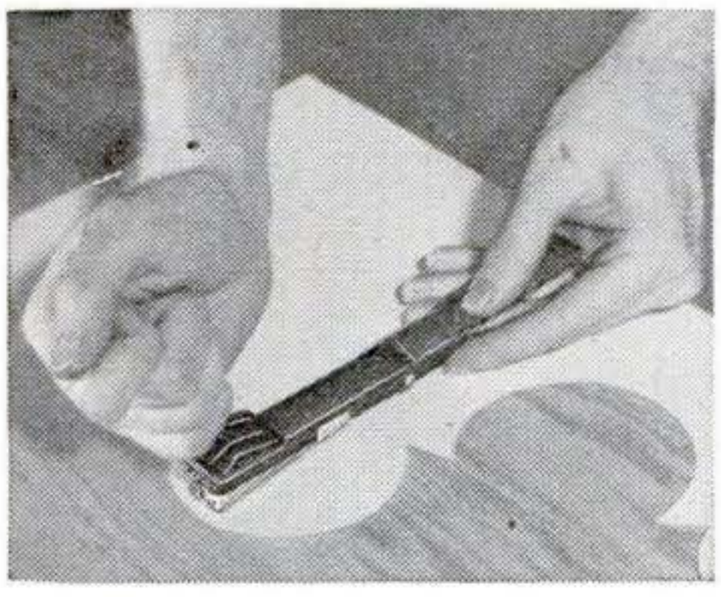
**STOP HEAT LOSS** by covering warm air ducts with asbestos paper. *Bostitch B-8* makes it an easy, one-night project.



**TORN CANVAS** on awnings or furniture can be mended by stapling parts with *Bostitch B-8.*



**SANDING BLOCKS** are easy to make when you tack sandpaper to blocks of scrap lumber with *Bostitch B-8.*



**KEEP PATTERNS IN PLACE** by stapling them to material to be cut. Lift them easily with *Bostitch B-8's* staple remover.

**$2.85**
Slightly higher in the West and Canada

**IT'S A STAPLER!**
**IT'S A TACKER!**
**IT'S A STAPLING PLIER!**
**IT'S A STAPLE REMOVER!**

*Bostitch gives you the only fasteners with staple remover attached.*

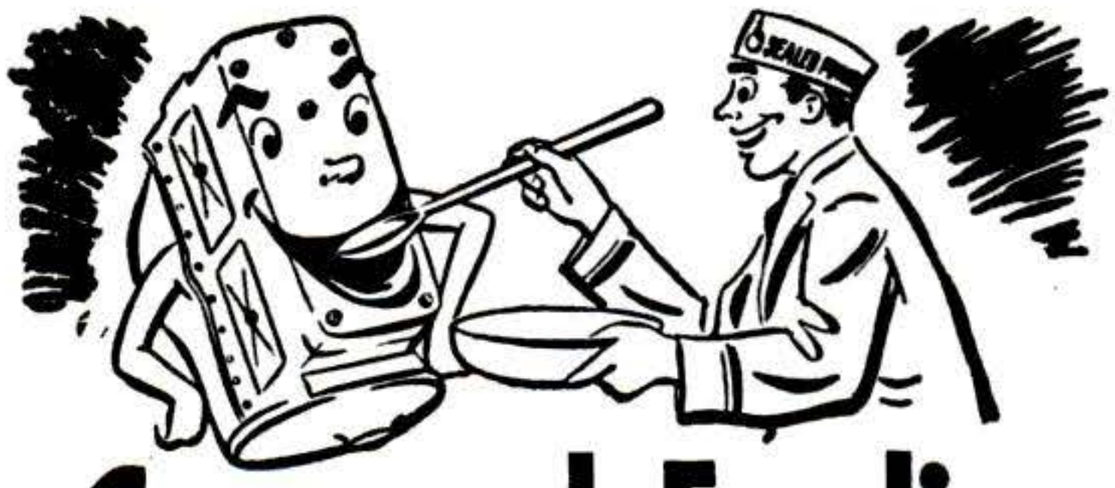
## with the *Bostitch B-8*
WITH REMOVER

The Bostitch B-8 is one of 800 Bostitch staplers and stitchers made for home, office and industrial use. For help in solving production line or shipping room fastening problems, write: BOSTITCH, 532 Mechanic St., Westerly, R.I.

**BOSTITCH®**
fastens it better AND FASTER with wire



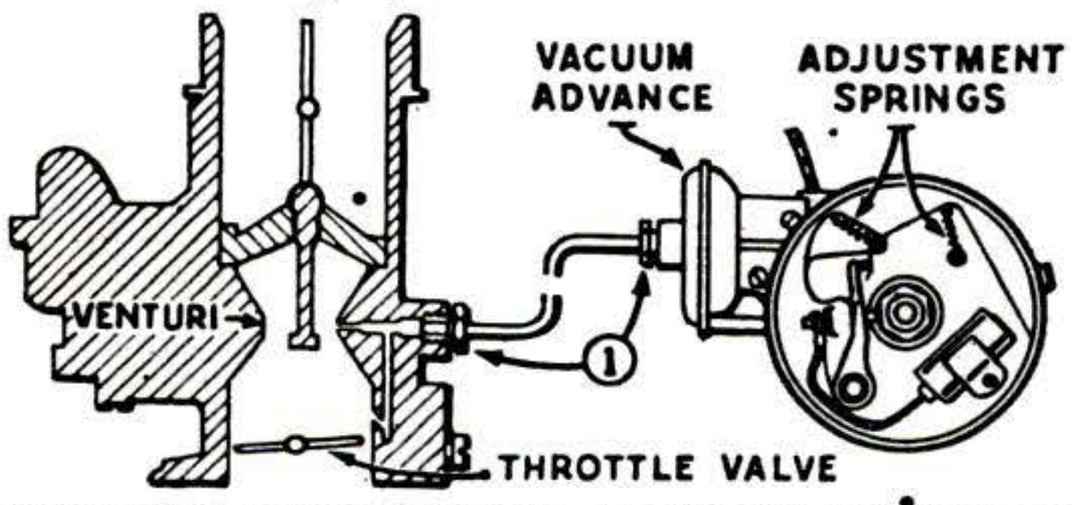
Copyrighted material



# Care and Feeding of Engines BY S. P. CORP

### POOR TIMING WASTES GAS

Your ignition distributor interrupts the primary circuit for correct timing of the spark, advancing the timing as your engine accelerates. A *vacuum distributor advance* connected to the distributor governs timing for sudden loads on the engine, such as fast acceleration.




### VACUUM DISTRIBUTOR ADVANCE HOOK-UP

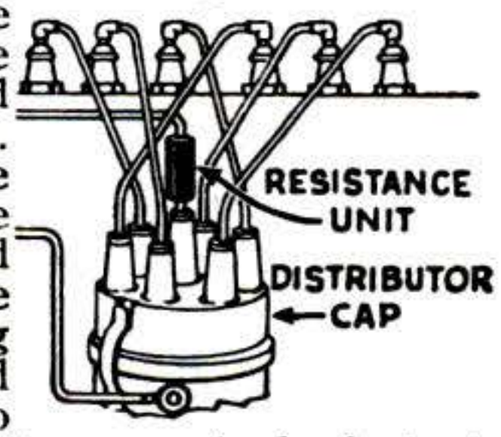
A small pipe line connects this vacuum advance to the carburetor, which furnishes the vacuum. Should this line become clogged, poor engine performance and low gas mileage can result. An engine may backfire and fill this line with gasoline, which would clog it.

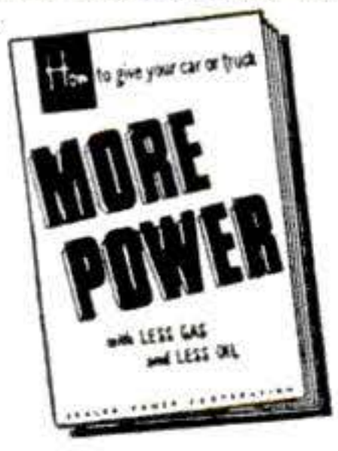
To correct, loosen nuts at each end of pipe marked (1), remove pipe from fittings, and blow it clear. *Caution:* When replacing, turn nuts halfway by hand before using a wrench, as threads are very fine and can be crossed, causing an air leak. It is a good idea to have the vacuum advance unit checked for diaphragm leaks, to protect gas economy.

### ONE CAUSE OF HARD STARTING

Your car radio uses a resistance unit to remove ignition interference. This is installed in the high tension lead from ignition coil to the center of the distributor cap. Being a carbon resistance unit, its resistance increases with age and heat from the engine.

Such increased resistance interferes with current to the spark plugs and can cause hard starting, also a high speed miss. As a rule, the correct resistance is marked on the outside of the unit. It can be removed and checked by any radio service man. Remove it by pulling the wires out of each end and placing the coil wire back into the distributor cap. With unit removed, check starting of engine. If trouble is corrected, get a new unit. Car radios require such a unit for good operation.




### GET VALUABLE BOOKLET FREE

"MORE POWER, Less Gas, Less Oil," a new booklet on car care, is yours for the asking. It tells about new Sealed Power KromeX Ring Sets. Write Sealed Power, Dept. H-12, Muskegon, Mich.


## Gus Rescues Ten Little Angels

[*Continued from page 182*]

He dismantled the carburetor filter and found dirt inside, but not enough to clog the works. The red, powdery deposit in the bottom was dry. Gus asked Wingate to turn the engine over.

When the other man pressed the starter button, the engine cranked over, but no gas came through.

"Okay, that's enough."

The fuel pump was the next suspect, and it wasn't a nice thought. If the pump needed a new diaphragm. . .

Wingate got out of the car again. "How's it coming?"

"I haven't found a thing yet."

Wingate shivered in the wind and held the flashlight while Gus inspected the pump. The line was dry.

### *Gus Gets His First Clue*

"You sure you've got enough gas?"

"First thing I checked."

"Did you notice anything strange about the way the car was running?"

"No. Before she quit, she was ticking away like a Swiss watch. . . Wait, I do remember something, only it didn't happen this evening. A couple weeks ago, the car started conking out near the top of a hill, about like this one, but I managed to make the top and she picked up again. It hasn't happened since. Or at least until now."

"That could mean almost anything. I'll go over the fuel line, and if I don't find anything, I'd better go after help."

The station-wagon door opened again when Gus crawled under, and Lydia Randolph spoke over a child's sobbing.

"Perry—any hope of getting on soon? Little Judy's crying. I'm afraid it may start the others to crying, too."

"Mr. Wilson's doing his best. I think we'll be on our way in a few minutes now."

### *Kids' Patience Begins to Wear Thin*

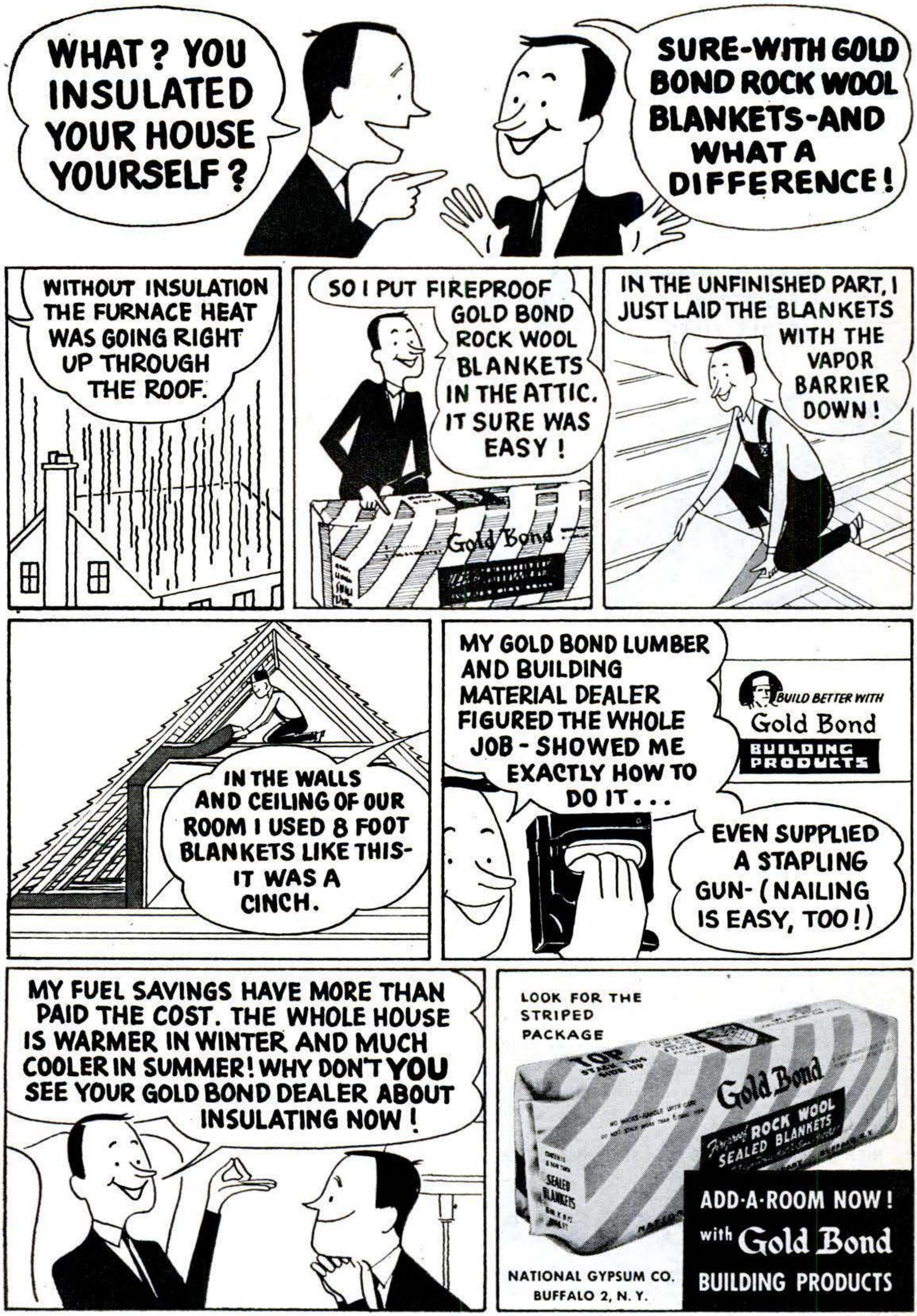
As Lydia opened the door to get back in, the little girl jumped out, and Wingate threw his coat around her.

"Judy, listen to me. You don't think Santa Claus is going to let you miss the chance to lead the choir, do you? Of course not. And little girls who cry get their voices all wet and rusty. Now you climb back in there and keep an eye on the other kids. We'll be starting for the church pretty soon."

[*Continued on page 234*]



Copyrighted material






Copyrighted material

Here's an ideal and most practical gift for amateur or professional craftsman—or perhaps for yourself. Indispensable for those final touches that bring triumph to a delicate fit or successful operation to a critical moving part. Accurately made of high-quality steel, Nicholson **X.F.** (*Extra-Fine*) Swiss Pattern Needle Files come in twelve assorted shapes; in popular lengths and a choice of cuts . . . all in a handsome blue-and-orange plastic case with bottom stand. *Sold by good hardware stores.*

**FREE BOOK, "*File Filosophy,*"** tells much about filing with Swiss Pattern and other files . . . in 48 interesting illustrated pages. Send for it.

**NICHOLSON FILE CO., 19 Acorn St., Providence 1, R. I.**
*(In Canada, Port Hope, Ont.)*

**NICHOLSON FILES** *FOR EVERY PURPOSE*


## Gus Rescues Ten Little Angels

[Continued from page 232]

"All right, Mr. Wingate," Judy sobbed.

Gus heard the door slam, then Wingate was back with the light. "I guess you heard —Judy was counting on leading the choir."

Gus bit his lip and followed the fuel line down the frame, trying to ignore the cold.

"Move that light a little to the left."

Gus grunted his disappointment and started to crawl out. Then he stopped and asked for the light again.

### *Gus Hits Pay Dirt at Last*

He took the flash from Wingate and ran it along the line, remembering what Wingate had said about it happening before, on a hill, like the one they were stalled on now. Gus stared at the wooden bed piece above the frame. What might happen on a hill?

Gus inserted a screwdriver between the fuel line and the bed piece where the two ran together. A little pressure warped it away from its original position. He ran a finger over the exposed side of the line, but found nothing. He moved the screwdriver down a few inches and tried again. This time he hit pay dirt!

"Now Mr. Wingate, if you'll get that friction tape from my glove compartment, you'll find your worries over with!"

"No kidding! Okay, hold on."

A moment later, Gus had the line taped securely, and he crawled out.

"Start it up, and turn on the heater for those kids."

The engine cranked for quite a while, but finally gas pumped through, and she caught hold.

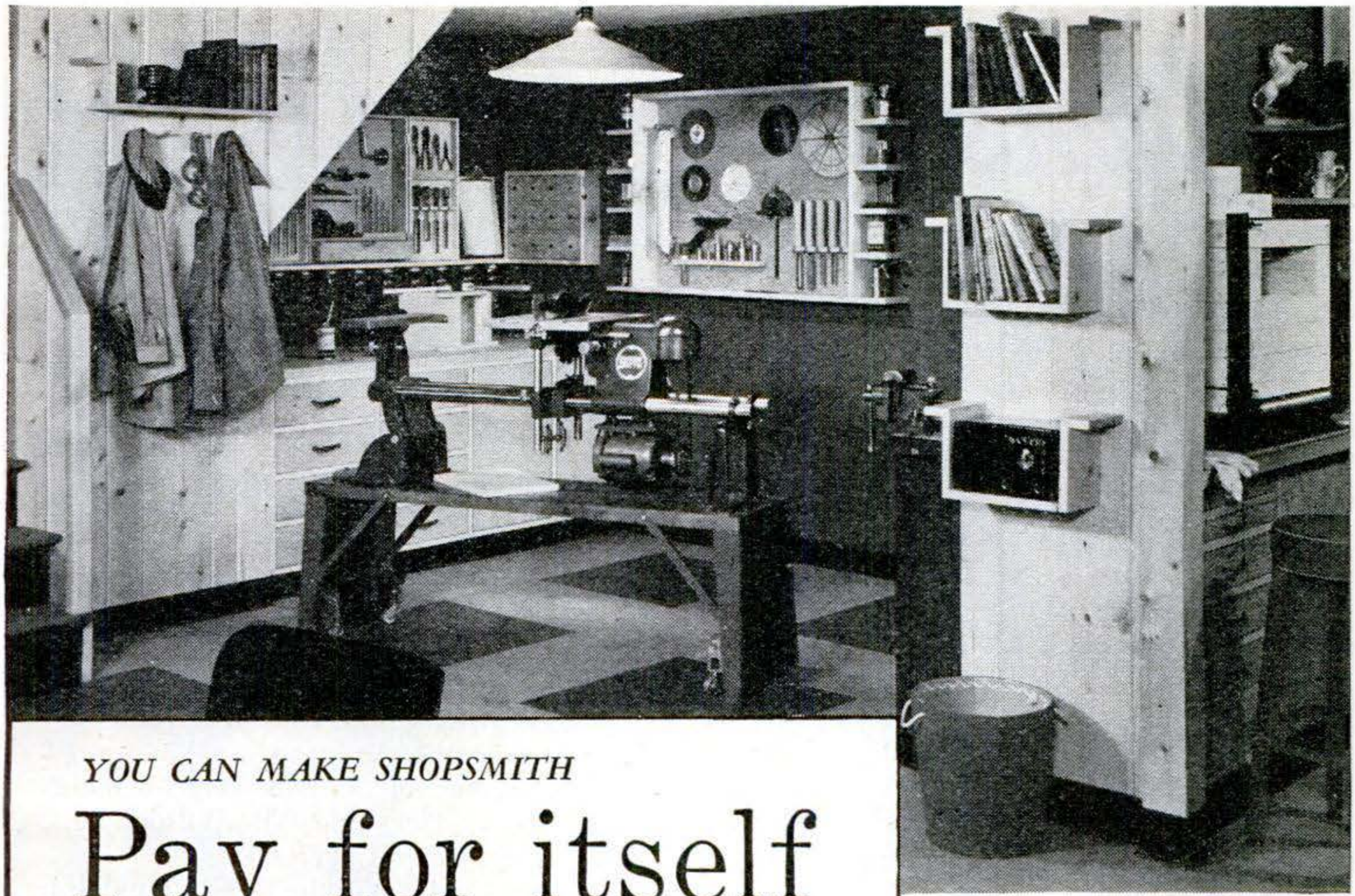
### *When Driver Shifts, Body Shifts*

"This is only a temporary repair. Better put a new fuel line in as soon as you can. What happened was, the line had a hole worn into it by a sharp edge of the wooden bed piece. You see, your station wagon is old, and the body has loosened up to where every time you go up a steep hill and shift into lower gear, the body slips back a little. Gradually, the copper tubing wore through at that point. This evening—and probably that other time you mentioned—when you started up the hill the body shifted enough to make the sharp piece of wood slide off the hole. So your engine ran only long enough to exhaust the fuel in your carburetor and pump and what little was left

[Continued on page 236]



Copyrighted material



*YOU CAN MAKE SHOPSMITH*

# Pay for itself

*ON A REMODELING JOB LIKE THIS*

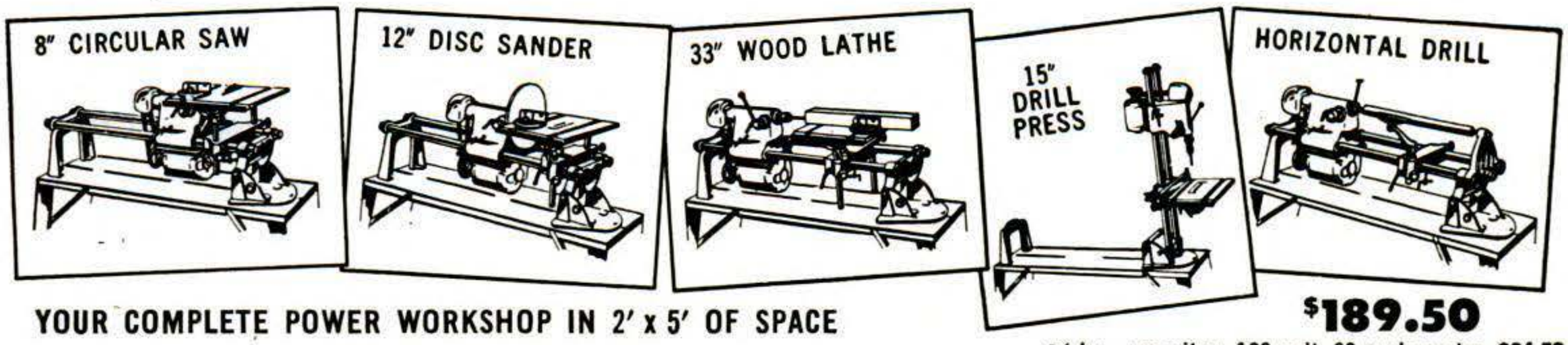
*Photograph by the makers of Armstrong Asphalt Tile*

Take a closer look at this attractive basement shop. Notice the fine workmanship . . . the beautifully fitted drawers and doors . . . the accurately mitered shelf joints . . . the expertly paneled walls.

Notice the SHOPSMITH, too! For this is the versatile power tool that makes it possible for *you* to do remodeling jobs like this! SHOPSMITH'S high precision accuracy and its simplicity of operation make it easy to turn out work of exceptional quality. And, in addition to the fun of doing it yourself, you can save $200-$350 on a project such as this—more than enough to pay for your SHOPSMITH.

You can do more jobs with SHOPSMITH—in less space—than with any setup of individual tools. Furthermore, in each of its five basic positions, SHOPSMITH exceeds most individual tools in accuracy, capacity, quality!

To prove all this to your own satisfaction, just see SHOPSMITH demonstrated and *compare* —at leading hardware and department stores or any Montgomery Ward store!




**YOUR COMPLETE POWER WORKSHOP IN 2' x 5' OF SPACE**

**$189.50**

½-hp., capacitor, 120-volt, 60-cycle motor, **$34.50**

SHOP SMITH

**MAGNA ENGINEERING CORPORATION**
**Dept. 223-A**
***at factory nearest you***
**12819 Coit Road, Cleveland 8, Ohio, OR**
**Menlo Park, Calif.**

Please send me a free copy of the SHOPSMITH catalog and the name of my nearest SHOPSMITH dealer.

*Name* _____

*Address* _____

*City* _____ *State* _____

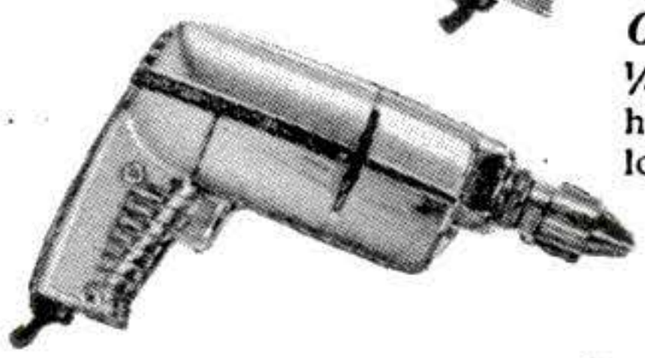


Copyrighted material

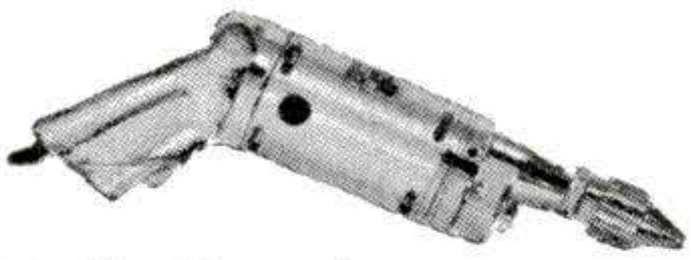
# A Man's Gift!

For that man among men who works with his hands. He's always wanted power tools, but he's been too unselfish to buy them for himself. Give him a PET Power Tool for Christmas!

*Mirror finished ¼" drill* Pistol grip, trigger switch, lock with instant release. Model 1950-HM. In gift box, **$19.95**

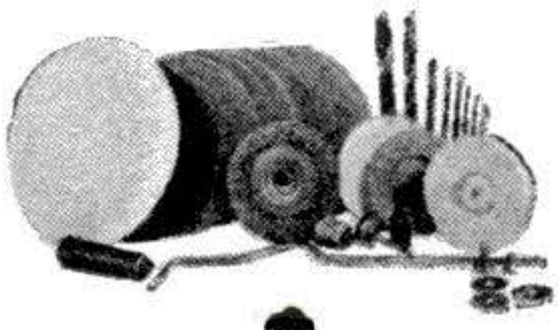


*Gold-tone finished* **¼" drill.** This will make him whistle! Tops in looks and performance. Model 1950-HB. In gift box, **$20.95**



*Chromium and satin finished* **¼" drill.** High quality, yet low in price Pistol grip, trigger lock Model 77-HC. In gift box, **$14.95**

*High-luster finished* **Zip-Sawer Jr.** Converts any ¼" drill into a portable saw. Rips, cross-cuts, trims. Model ZP-1. In gift box, **$7.95**



*35-pc. attachment set.* Fits any ¼" drill. Sands, grinds, sharpens, waxes, polishes. Nine drills, too. Model AP-10. In gift box, **$7.95**

PET POWER TOOLS

**Favorite of "DO-IT-YOURSELFERS"**

**Look for the PET Christmas Tree Display at your dealer's!**

**PORTABLE ELECTRIC TOOLS, INC.**
**320 W. 83rd St., Dept. PS-122, Chicago 20, Ill.**
**In Canada: Portable Electric Tools, Ltd., Toronto, Ontario**


## Gus Rescues Ten Little Angels

[Continued from page 234]

in the line in front of the break. On level ground, the wooden section keeps the hole plugged up, and you have normal operation. I've warped the line away from the sharp spot and taped it up. . . Well, you people better get started."

"Can't I pay you for your work? No need to tell you how grateful—"

"Forget it. It's Christmas Eve."

### *Gus Says "Merry Christmas!"*

Gus rapped on the window of the station wagon, shouted a "Merry Christmas!" to the kids and turned to get into his own car. But little Judy was trying to tell him something through the glass. Gus couldn't make out a word. Finally she got the window rolled down and stuck her head out.

"Please, Mr. Wilson, won't you come and hear us sing? We all want you to!"

Then the rest of the kids were all shouting at once. "Please do, Mr. Wilson!" . . . "We'll sing one just for you."

"Do come, Mr. Wilson," Lydia Randolph urged. "It would make them very happy."

In the face of such enthusiasm, Gus weakened rapidly. He felt sure the Rheingolds would forgive him for his tardiness when he told them the story. "Okay," he agreed with a wide grin, "let's get going!"

The children's delighted whoops of approval followed him as he climbed into his stone-cold car and started her up.

### *Ten Little Angels Sing*

Forty minutes later, Gus was seated in the rear of the church, thawing out comfortably. The children, starched and shiny in white, looked like 10 little angels.

Then Judy's voice lifted above the others, high and clear, as the choir sang the first lovely notes of *Silent Night, Holy Night.* And as Gus sat there, warmed in heart as well as in body, it seemed to him that Christmas had already arrived, on this evening of December 24—and that it was the finest Christmas ever. END

---

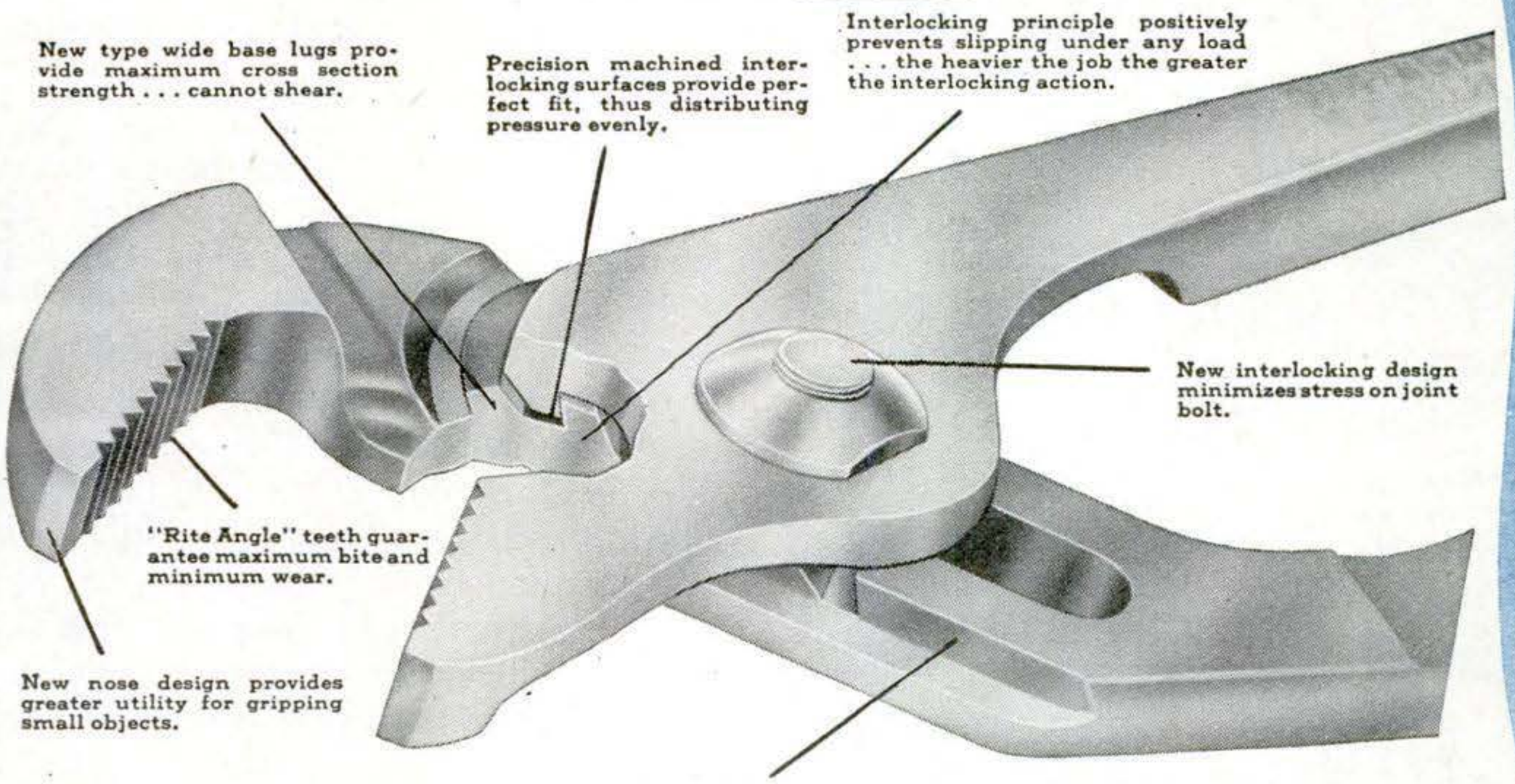
## Going Is Better

Girl: "Sometimes my father takes things apart to see why they don't go."
Boy Friend: "So what?"
Girl: "So you had better go."—*The LIFE Aetna-Izer*

# The plier design that OBSOLETES all others

## THE NEW No. 420 CHANNEL LOCK PLIER

TRADE MARK REG. U. S. PATENT OFFICE

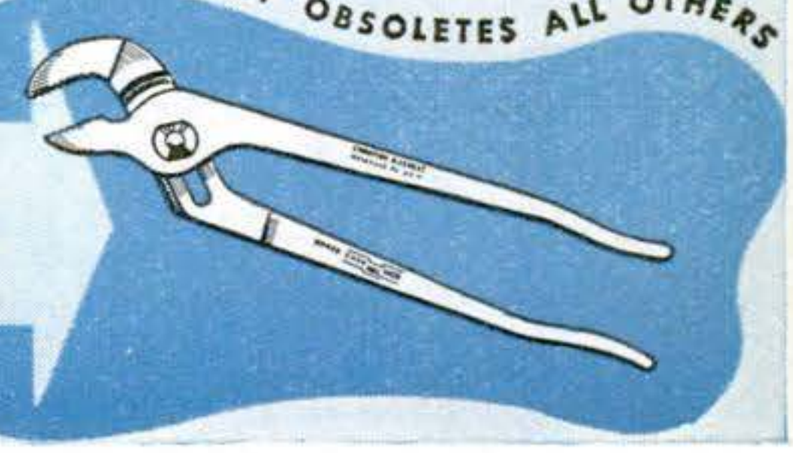



Channellock pliers are listed in the Yellow Pages of most Telephone Directories under "Tools"

Here's the new, improved Channellock Plier—bringing to you new features which offer more positive gripping, greater strength and longer wear. The undercut interlocking channel is the first really new idea in plier design in years. Engineering skill has developed a plier with new patented features which give you the newest, strongest, most practical plier you can buy. Here is a plier that will last for years! Channellock Pliers—made only by Champion DeArment Tool Company, Meadville, Pa.

*Send for your Catalog today.*

THE PLIER DESIGN THAT OBSOLETES ALL OTHERS



*Only* CHAMPION DeARMENT *makes* CHANNEL LOCK

CHAMPION DeARMENT TOOL CO. • MEADVILLE, PA.



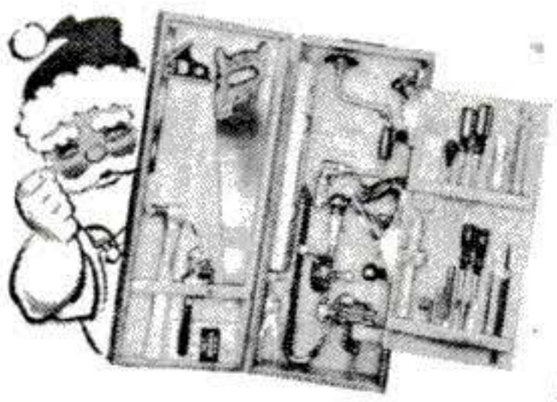
Copyrighted material

# Merry Christmas!

# STANLEY TOOLS

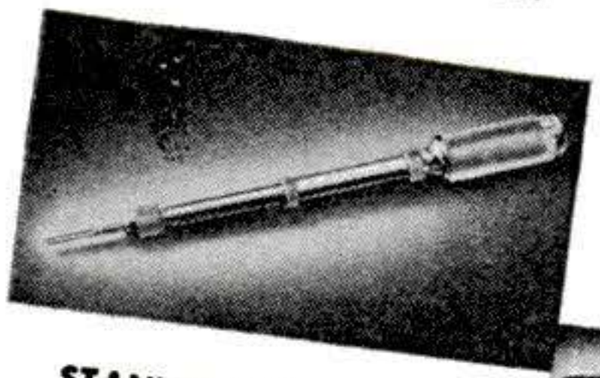
A Christmas "natural" to warm the heart of any man or boy! Give Stanley Tools . . . complete sets in chests or tools in Christmas boxes. Buy them at your hardware dealer's. Look for the famous STANLEY trade mark.

STANLEY TOOLS, NEW BRITAIN, CONN.

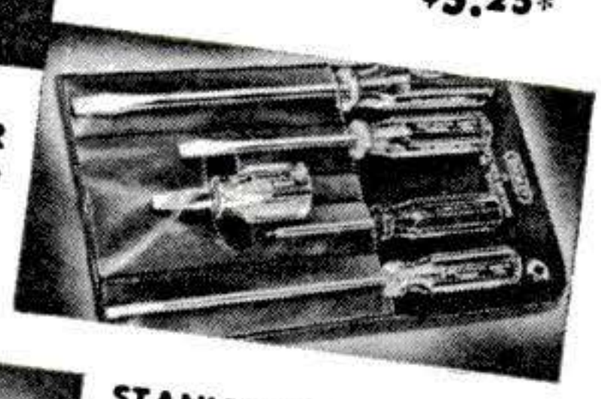


**HOBBY HOUSE SET No. 910** — A top-notch group of tools to make any man or boy feel proud. **$72.50***

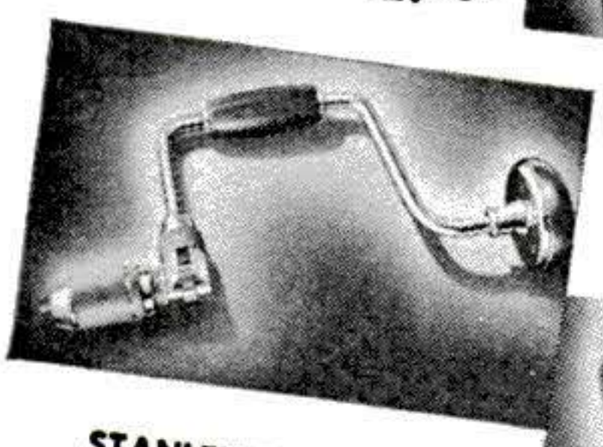
**OTHER CHESTS AND SETS FROM $23.75* UP**



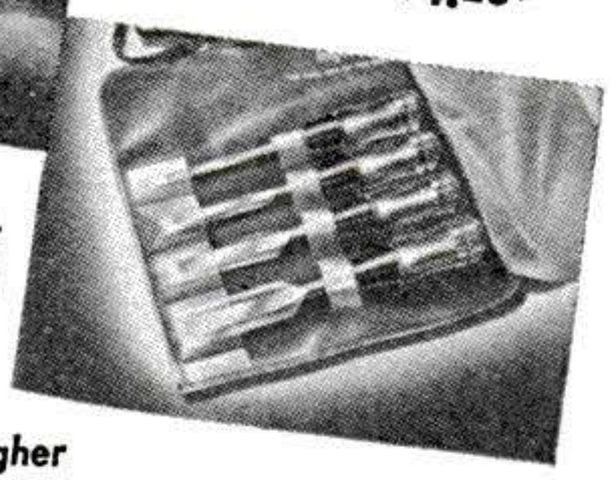
**"YANKEE" PUSH DRILL No. 41** — None better for boring small holes in wood or plastics. 8 Drill Points in handle. **$5.25***



**STANLEY SCREW DRIVER SET No. X3000M** — Five drivers for home use, and a handy kit to hold them. **$2.80***



**STANLEY BIT BRACE No. X1250** — Well-made for tough boring jobs. Beautifully finished. **$4.25***



**STANLEY CHISEL SET No. X64** — 1/4", 1/2", 3/4" and 1" with plastic handles and a kit to hold them. **$10.50***

***Western Prices Slightly Higher**

**SEND FOR THIS BOOK—IDEAL FOR CHRISTMAS GIVING . . . . . $2.00**
Stanley Tools, 4122 Elm St., New Britain, Conn. In Canada: Stanley Tool Co. of Canada, Ltd., 4122 Stanley St., Roxton Pond, Quebec.

THE TOOL BOX OF THE WORLD

**STANLEY**

Reg. U.S. Pat. Off.

**Hardware • Tools • Electric Tools • Steel Strapping • Steel**


## 1953 Packard Has Power Steering

[*Continued from page 118*]

chanical movement of the Pitman arm.

Packard, to put it as simply as possible, has put the power boost between the Pitman arm and the steering linkage. The others have put it between the steering wheel and the Pitman arm.

All three types of power steering make use of the same source of power, a pump driven by a belt off the crankshaft. All three include a bypass valve, which immediately returns the car to normal steering in case the pump fails. That's an important safety factor. And, because of the hydraulic cushion of oil present at all times when the pump is operating, all reduce road shock and driving fatigue.

### *Packard Compromised*

GM's power steering has a special difference from others. Its control valve contains compressed springs, and the valve doesn't work until the springs have been overloaded by a pull of about three pounds on the steering wheel. This was done to let the driver retain the full feel of the road when going straight ahead. But some people complain that it results in a squashy feeling, a sensation of not being firmly linked to the front wheels, when only a slight amount of pressure is applied to the steering wheel.

There are other people who complain, though, that Chrysler's power steering is too sensitive. That certainly has not been my experience with it.

Packard has succeeded in finding a compromise between the two.

There's a story to the effect that a small, slight woman, unassisted by power steering, has to exert as much strength to park a heavy car like a Packard as she would use to haul herself up a 15-foot rope. Packard has now spared her about 80 percent of that effort. END

---

### This One Smells

"You're not eating your fish. What's wrong with it?"
"Long time no sea."—*The Columbian Crew.*



Copyrighted material

# Want the greatest Christmas ever?

**COME RIGHT OUT AND ASK YOUR FAMILY FOR THE**

# DELTA SHOP

## ...DOES 98% OF HOME-SHOP JOBS

Here's a one-motor combination shop that makes sense—the four most-used regular Delta Homecraft tools in a unit that takes only a 3-foot square—built around a husky 8″ circular saw *with tilting blade.* Plus a big-capacity 4″ jointer, versatile 11″ drill press, sturdy disc sander. Not a group of attachments, no time-wasting setting-up and adjusting. Ready to work! Nothing to compare with it—for big value, small size and best of all, LOOK . . . only **$209.95*** including the steel stand.

Later, if you have more room for a bigger shop, it's easy to separate your Deltashop into individual tools. Or you can build the DELTASHOP tool-by-tool as your funds permit.

*Motor and motor accessories extra.

## OR MAYBE YOUR SHOP NEEDS ONE OF THESE FINE TOOLS. . . .

**DELTA Homecraft 11″ LATHE**

for the expert who loves turning. Make furniture,

lamps, toys, hundreds of excellent projects.

**$57.25**

**DELTA Homecraft 10″ BAND SAW**

for inside and outside curve cuts, and for cutting stock too thick for the circular saw. For hardwood, too—and plastics, light metals.

**$46.95**

**DELTA Homecraft 16″ SCROLL SAW**

Do intricate patterns and delicate cutting like marquetry, fine fret work, inlays, veneers, jig saw puzzles. A wonderful tool for starting your youngster's shop training.

**$37.95**

**Special!**

**A DELTASHOP GIFT CERTIFICATE**

Here's the ideal way to present this ideal gift for any man—get an attractive DELTASHOP Gift Certificate Box from any Delta dealer.

## HAPPY NEWS FOR A MODEST CHRISTMAS BUDGET...

**GIVE A DOWN-PAYMENT**—What gift so appropriate for a family that watches the dimes, as a down-payment on a DELTASHOP! Delta dealers have an easy-payment plan; actually the tool soon pays for itself.

DELTA MILWAUKEE

**DELTA POWER TOOL DIVISION**

**Rockwell** MANUFACTURING COMPANY

504P NORTH LEXINGTON AVENUE • PITTSBURGH 8, PENNSYLVANIA

*There's a Delta Power Tool for Your Job-*



Copyrighted material

**How Soon Will You Ride Jets?**
[*Continued from page 123*]

the answer lies in reverse jet. And that's being worked on, too.

**Q** ***Any difficulties, then, in actual flying of the airplane?***

**A** Pilots agree that jets fly more easily than conventional planes. But there are problems that begin from the moment the jet pilot gets his clearance for take-off. Schedules must be much more rigid. Estimated time of arrival must be accurate within minutes so that there won't be any delay in getting landing clearance. A jet plane cannot afford to wait over an airport—especially at low altitudes where the engines hog fuel.

Navigation presents its own set of problems. At 40,000 feet radio signals from ground navigation-aid stations overlap so that several signals may be received at one time. Fewer stations may be the answer. Using ADF (Aircraft Direction Finder) or Loran, it takes a jet navigator up to five minutes to determine his exact location. By that time, at 600 miles an hour, the plane would have traveled 50 miles. Within the U.S., very-high-frequency radio does the job for him satisfactorily. But for over-ocean navigation there is no answer yet. True ground-speed indicators may be the solution.

Also, airborne radar is a must for commercial jets to enable the pilots to dodge turbulence, heavy rain, ice, hail and mountains while climbing. A pictorial, television-like presentation may be used. Douglas, for instance, has made provision in its commercial jet plans for a 10-inch-wide screen in the cockpit. END

**Blonde Problem**

A SCIENTIST says that in another 100 years there will be no blondes left in this country. No doubt. It's hard to leave one today.—*Pure Oil News.*


# UNCLE WALTER

Copyrighted material

Eager power

Thrilling speed

Great stamina

# It's got EVERYTHING

# HARLEY-DAVIDSON

## HYDRA-GLIDE®

Years ahead in design. Miles ahead in power. It's loaded with features that make it the best motorcycle that ever came down the road. The improved 55 HP, 74 OHV motor has engineering advances few automobile engines can boast... hemispherical combustion chambers, hydraulic valve lifters and rotating valves. That means power to thrill you, speed to dazzle you, performance under any condition that makes you proud you own this most wanted of all motorcycles.

Try a ride today. See your Harley-Davidson dealer and take a buddy along. Or send 25¢ for illustrated literature and a copy of the Enthusiast magazine, filled with exciting action pictures and stories. Harley-Davidson Motor Co., Dept. PS, Milwaukee 1, Wisconsin.

**HARLEY-DAVIDSONS**
**win national events**
**Peoria T. T. Championships**
**45" Class — 1st**
**80" Class — 1st**
**National Class C Hillclimb**
**1st in all 4 events!**



Copyrighted material

"Here's a Year 'Round Gift... that's 3 Tools in One"

**Ideal to Give or Get!**
**SARGENT PARALLEL-ACTION PLIER No. 102**
**the mechanical hand**

*Grips like a vise*
*Cuts wire easily*
*Holds nuts like a wrench*
*Gets into tight spots*
*Unkinks wire*

Give a Sargent Parallel-Action Plier for Christmas . . . the favorite tool of mechanics, sportsmen, farmers and handymen everywhere. Finished in bright Nickel and available in 4½", 5½", 6½" and 8" lengths, in special Christmas boxes at your hardware dealer. For further details, write Dept. 26M.

SARGENT of New Haven

*Builders Hardware and Fine Tools since 1864*

**Sargent and Company**
**NewYork • NEW HAVEN, CONN. • Chicago**

*Show this advertisement to your favorite Santa.*


## World's Most Mysterious Footprints

[*Continued from page 136*]

Tensing told Eric Shipton that he had seen a Snowman 25 yards away in 1950. The Snowman was, Tensing said, about five feet six inches tall, covered with reddish brown hair, but with a hairless face. He had a long, pointed head.

After cross-examining Tensing, Shipton said, "Whatever it was, it was neither a bear nor a monkey, with both of which animals he was very familiar."

### *Description Fits Cave Man*

Is the Abominable Snowman—could he be—a man, a cave man perhaps? Scientists never have dug up the foot bones of a prehistoric man, but their drawings of cave men, based largely on skulls that have been unearthed, show hairy, crouching men with apelike brows.

It seems a fantastic idea. And yet prehistoric man lived in caves, like the caves found in the Himalayas. Cave men hunted with arrows, whose heads scientists have unearthed. Cave paintings show the bow. And cave men descended from their mountains to hunt woolly, horned beasts not unlike the yak.

Prehistoric man, scientists believe—again because of those skulls—had a great brain capacity and sharp eyes. He could conceivably keep out of sight of his enemies. Cave men buried their dead, often in the ground inside the caves. No body or skeleton of the Abominable Snowman has ever been found.

### *Himalayas a Land of Mystery*

The Himalayas are 1,500 miles long and 150 miles across. They are largely unexplored. Nepal and Tibet for centuries were—and largely remain today—forbidden to white men.

Those explorers, mountaineers and scientists who have gotten into these lands have discovered hundreds of new insect species, including giant moths and locusts that are blown by gale winds even to the mountain peaks; fishes equipped with suckers to hold onto rocks against the mountain torrents;

[*Continued on page 244*]



Copyrighted material

**HASTINGS PISTON RINGS**

# Tough

# BUT OH SO

# Gentle

**TOUGH** on oil-pumping
**GENTLE** on cylinder walls

Using too much oil? You need the piston rings that are *tough* on oil-pumping.

Want to stretch your engine's life? Then get the rings that are *gentle* on cylinder walls.

There's just one thing to do about worn-out piston rings and that's replace them—and the more you delay the more you'll pay.

You'll save money if you replace them with Hastings Piston Rings. They're engineered exclusively for replacement service. They *stop* oil-pumping, *check* cylinder wear, *restore* engine performance—for thousands of extra miles. It's the best money you can spend on your car.

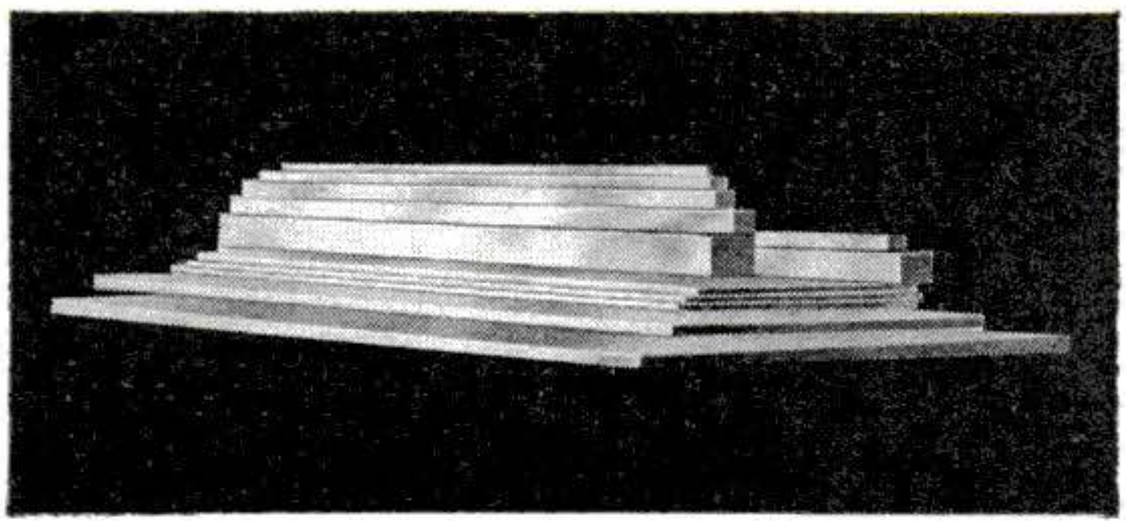
HASTINGS MANUFACTURING CO., Hastings, Mich.
HASTINGS LTD., Toronto
Piston Rings, Spark Plugs, Oil Filters, Casite, Drout

# HASTINGS

## STEEL-VENT PISTON RINGS

Copyrighted material

# Starrett PRECISION GROUND DIE AND FLAT STOCK



## NOW AVAILABLE IN 4 TYPES - 295 SIZES

**Big shops, small shops, mechanics and craftsmen — they all use Starrett Flat Stock. Ideal for making dies, gages, model and machine parts, special tools and precision pieces. Made of high grade annealed tool steel, precision ground to size — ready to layout and cut out. Comes in 18 and 36 inch lengths in a wide choice of widths and thicknesses — air, oil, oil or water, and water hardening types. See your industrial distributor—or write for information.**

**JUST LAY IT OUT AND SAW IT OUT WITH STARRETT BAND SAWS**

Starrett Metal Cutting Band Saws are especially adapted for precision sawing and contour cutting. For best results, use Starrett Band Saws.

**SEND FOR IT — ONLY 10¢**
**Starrett "Tools and Rules" Book**
shows the right tools for any measuring job. 50 pages, 100 pictures, helpful reference tables. Address Dept. PS

**THE L. S. STARRETT COMPANY · ATHOL, MASS., U.S.A.**

TRADE MARK Starrett REG U S PAT OFF
STARRETT TOOLS
SINCE 1880
WORLD'S GREATEST TOOLMAKERS
Buy THROUGH YOUR INDUSTRIAL DISTRIBUTOR
Prompt delivery
Dependable service
Quality products

**MECHANICS' HAND MEASURING TOOLS AND PRECISION INSTRUMENTS**
**DIAL INDICATORS • STEEL TAPES • PRECISION GROUND FLAT STOCK**
**HACKSAWS, BAND SAWS and BAND KNIVES**


### World's Most Mysterious Footprints

[Continued from page 242]

gorgeous birds—woodpeckers, bee-eaters, sunbirds, peacocks and snow partridges; and strange animals like barkless wild dogs, cat bears, water shrews and bamboo rats.

#### *Cave Men Do Live There*

In the frigid hell of the upper mountains, even the dogs have wool and the pigs have thick coverings of hair. The yak has both: a coat of thick wool, covered outside by hair that hangs down like a bathrobe almost to its ankles and protects it legs and belly. A hairy man is not out of the question.

But of all the discoveries in the Himalayas, the one that grips the imagination most was made in 1921, the year Colonel Howard-Bury first reported the Snowman's tracks. That year, two Canadian explorers—Jill Crossley-Batt, a woman, and Dr. Irvine Baird—actually found in that region a tribe of 800 cave dwellers which had been isolated from the human race for centuries. These people had remarkable paintings on goatskin. They lived 17,000 feet high—higher than any other men are known to live.

#### *Bear? Ape? Or Missing Link?*

The Abominable Snowman may turn out to be a 100- or 200- or 400-pound bear or monkey or ape, or more than one of them, or something else again. Any of these could be something over five feet tall, the average height reported for Snowmen by those who say they have seen them. Eric Shipton is not on record with a definite statement of his opinion. But he has hinted.

"It may be," says Shipton, apparently thinking of the possibility of discovering a prehistoric mountain climber, "that our passion for mountaineering has a deeper origin than we suppose." END

---

### Hooray!

THE college yell of the school of experience is silence.—*Pure Oil News.*



Copyrighted material

PERFECT Christmas Gifts

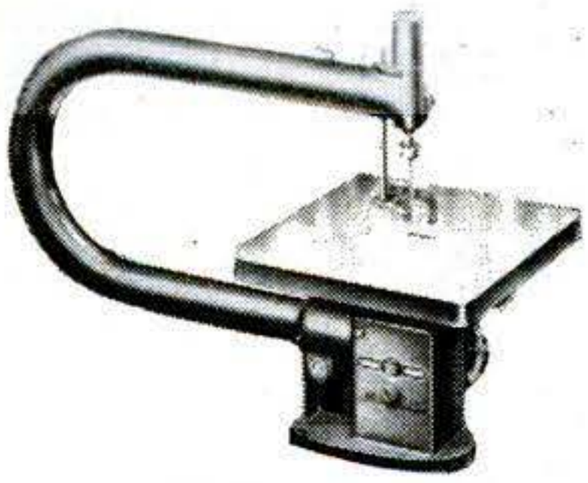
# LOW COST QUALITY BUILT!

## Atlas Woodworking Tools

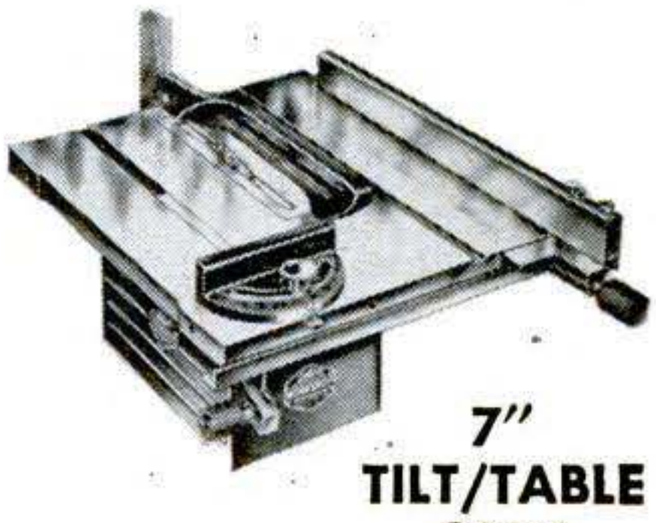
You'll hit the jackpot on Christmas Day with any man or scout-age son if you give one of these fine, low-cost Workshop tools. If it's his first power tool get a table saw, the basic shop tool. Note the 3 sizes and prices for your selection. If he has a power saw, then a jointer-planer is the tool for him . . . he'll use it on every woodworking project. A drill press will equip him for a host of practical time-and-money-saving operations. A band saw for sawing curves and irregular shapes, a jig-saw for all kinds of internal sawing will give him years of practical woodworking fun.

Ask your Atlas-Workshop tool dealer to show you the tools and all their fine construction features, or send a postcard and ask us to RUSH a catalog.

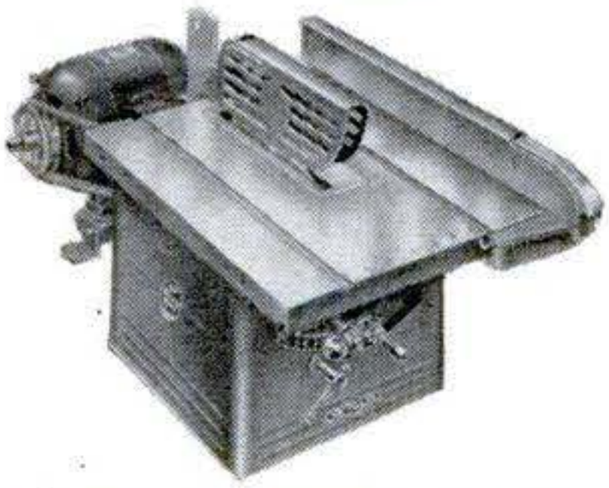
8" TILT/ARBOR SAW
ONLY $61.75



18" JIG SAW
ONLY $39.95

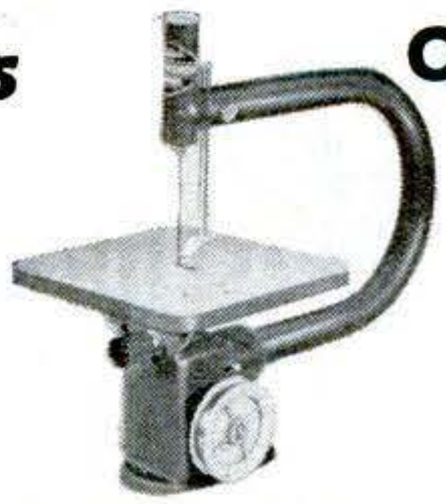


7" TILT/TABLE SAW
ONLY $27.75

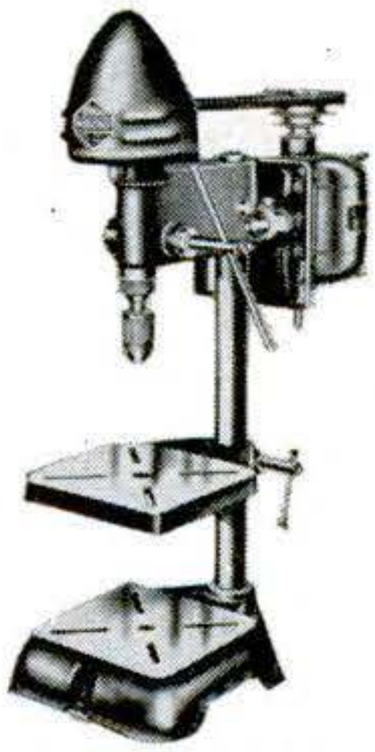


7" TILT/ARBOR SAW
ONLY $44.75

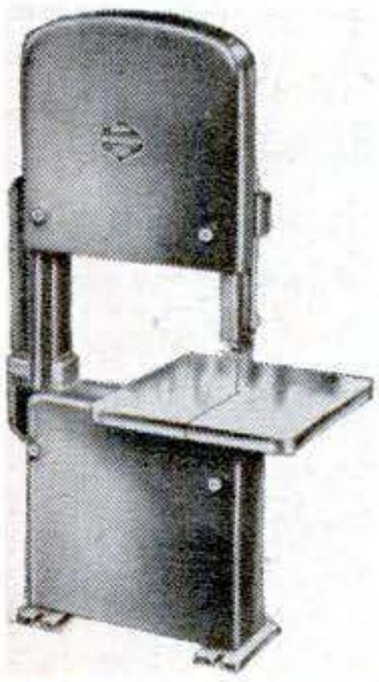
Atlas WORKSHOP TOOLS



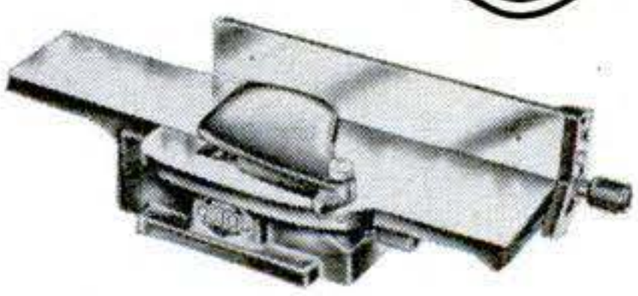
13" JIG SAW
ONLY $18.50



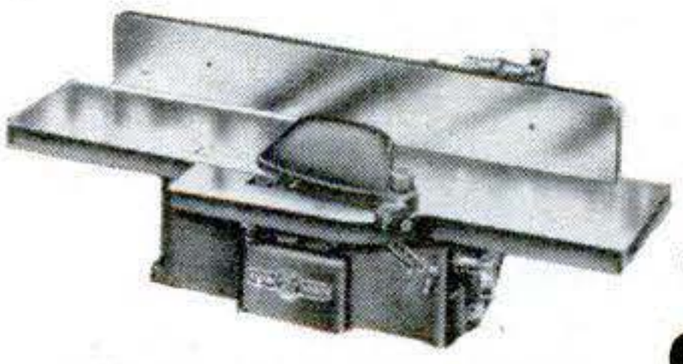
11¾" DRILL PRESS
ONLY $33.95



10" BAND SAW
ONLY $37.75



4" JOINTER-PLANER
ONLY $24.75



4" JOINTER-PLANER
ONLY $49.95

All prices F.O.B. Kalamazoo, less motor.

**ATLAS PRESS COMPANY**
1225 N. PITCHER ST. • KALAMAZOO, MICHIGAN

Atlas DEPENDABLE QUALITY TOOLS SINCE 1911




Copyrighted material

a Worn-out

A dirty, damaged or over-age motor thermostat impairs your car's cooling system, often resulting in engine "boil-overs", loss of anti-freeze. An over-heated engine wastes gas and oil . . . while one that runs cold fails to warm your car heater.

Protect both your comfort and pocketbook. Get your Service Man to check your car thermostat. And if a new one is needed —

Replace with

Autostat®

motor thermostat by Fulton Sylphon

for faster starts and faster warm-ups; more miles per gallon, more comfort per mile. Save oil and reduce car maintenance. Types for every make and model.

In home, industry, and transportation, EVERYTHING'S UNDER CONTROL

Robertshaw-Fulton

CONTROLS COMPANY

FULTON SYLPHON DIVISION
KNOXVILLE, TENN.

BRIDGEPORT THERMOSTAT DIVISION
BRIDGEPORT, CONN.


## Biggest Science Stories of 1952

[*Continued from page 153*]

**Fraley** of *The Evening Bulletin* in Philadelphia. With the announcement that the fall of '52 would see an atom-bomb test that will result—if successful—in an "explosion greater than has ever been set off before," it looks to Fraley as if the age of the hydrogen bomb is here.

### *War May Become Obsolete*

"From the vantage point of the scientist 100 years from now," he says, "that may be the only thing worth remembering, scientifically, about this year. The implications are staggering. The H-bomb may render war obsolete. Controlled nuclear fusion will give us sources of energy so potent that electronic machines will do most of man's hard work.

"A development that has even the potentiality of creating a world with limitless opportunity for constructive and creative pursuits is surely the biggest news story of the year."

### *Peaceful Use for H-Bomb Seen*

The prospect of constructive use of the H-bomb reaction was the big story as **Watson Davis,** director of Science Service, sees it. He reports:

"Hints that the starting temperature of the fusion process is not necessarily millions of degrees have come from the latest studies of the sun and stars. If this is so, the peaceful harnessing of the H-bomb could follow. Controls would be needed, but would not be impossible.

"If the H-bomb can be made of peaceful and industrial use, there is a chance that it will be a blessing instead of a curse upon civilization. Any science achievement that could control people, or rather allow reasonable people to control the world, would be the top science story of all time." END

---

### Gas Can Be Fatal

A SIGN in a western town reads: "4,029 people died of gas last year—two inhaled it, 27 put a lighted match to it, and 4,000 stepped on it. —*Pure Oil News.*



Copyrighted material

PREPARE NOW FOR POWER FAILURE!

# WAR SURPLUS GENERATING PLANTS

**Available for Immediate Delivery • Large Stock • Many Sizes from 350 Watts to 25 KVA**

ITEM #183

**Item #183—3000 to 4000 WATT GENERATOR SET — FEATURES —** Power for your home or business. Simply connect to power panel or house circuit. • Constant voltage regardless of load. • Push button start or stop. • Easily made full automatic start or stop. **SPECIFICATIONS** — Sizes 19"x30"x48". Steel skids, weatherproof housing, requires no building. Wt. 725 lbs. • Hercules 4-cyl. 10 HP gasoline engine. Load governor. Oil filter. Quiet muffler, 6-volt starter, generator. Hobart 115 volt, 60 cycle, 3000 to 4000-watt generator. Furnishes either single or three-phase power, 2 or 3 wire. • Panel contains oil gauge, voltmeter, ammeter, circuit breaker, voltage regulator, start button. Today's cost over $1200.00. SALE PRICE, F.O.B. Chicago **465.00**

ITEM #301

**Item #300—Model C1B—3 KW—110 Volts D.C.** This mighty mite develops 3 KW—28.5 amps. D.C. Standard Delco generator direct coupled to a Model ZZP Briggs and Stratton 1 cylinder, 5-7 HP, air cooled, rope starting gas engine. Instruments include voltage control rheostat & voltmeter. Wt. 275 lbs. F.O.B. Chicago. . . . **295.00**

ITEM #178

**Tiny Tim Battery Charger**

**Item #301—Model 125** to charge 6 and 12 volt batteries —12 volts—300 Watts; Heavy Duty Generator; Automatic Shut-off; Push button self-starter; 2 qt. gasoline tank in base; Ammeter; Generator cut-out; Concealed coil, etc.; Speed and charging rate control; Attractive orange finish; Weight 93 lbs.; Length, 15½", width, 11¾", Height, 14¾". F.O.B. Chicago..... **89.00**

**Item #334—Power unit PE-77D** is a compact electric generating set consisting of a 1-cylinder, 4 cycle, L head, air cooled, manual starting (rope) Briggs & Stratton gasoline engine, directly connected to a d-c self-exciting generator. The engine is rated 1.3 horsepower at 2650 revolutions per minute and operates 5 hours on one gallon of gas. The generator is rated 0.25 KW, 250/350 watts, 115 volts, 2.2 amperes direct current. Plug in to double receptacle for easy connection. F.O.B. Chicago. **115.00**

MANY WAR SURPLUS ITEMS

ORDER DIRECT FROM AD

## Shop by Mail and Pay Less at GROBAN'S

LARGE SUPPLY

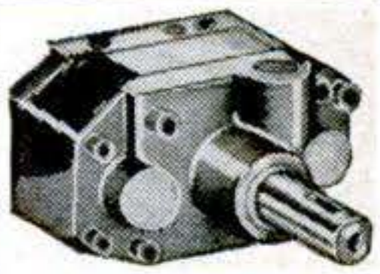
ALL ITEMS GUARANTEED

**Item #201—PE 95-G—10 KW—110/220 Volt 60 Cycle A.C.—** Single Phase. Totally enclosed. Onan generator direct coupled to Willys Jeep, 4 cylinder, water cooled engine, push button start. Instrument panel with engine and generator instruments, circuit breaker, controls, etc. Uses 6 volt car battery. (Battery not incl.) Skid mounted. Ship. wt. 1500 lbs. F.O.B. Chicago ..... **1295.00**

ITEM #350

**LOGAN AIR CYLINDER Item #350** — Double acting pneumatic cylinder, 6" bore, 6" stroke, 1½" shaft. Adjustable cushions at both ends. Flange mounting at shaft end. Overall length closed 18". Ideal for use in 125 PSI systems. Shipping weight 40 lbs. F.O.B. Chicago. **39.50**

**Item #29KJ** —Gear Type Hydraulic Pump. Ideal in industrial applications and for operating all hydraulically powered farm implements including loaders, stackers, swathers, plows, etc. Delivers 1000 PSI (may be set at lower PSI if desired). 12 GPM at 400 RPM. Maximum operating speed 800 RPM—rotation counter clockwise. Has built-in relief valve, permanent or torque bar mounting, 1" diameter shaft, ¾" pipe tap inlet, ½" pipe tap outlet. Ship. wt. 22 lbs. F.O.B. Chicago **45.50**



## HEAVY DUTY HYDRAULIC and AIR EQUIPMENT

**Large supply of new labor-saving, economical hydraulic equipment in many types and sizes. Use these positive, highly efficient smooth pressure hydraulics on presses, arbors, lifts, loaders, power control, positioning, brakes, plastic dies, auto frame alignment, etc.**

**LOGAN 4-Way, Foot Operated AIR VALVE, Item #59. Model 6520**—Ideal for operating air vises, presses, air machinery, and other double acting pneumatic devices. Heavy cast construction. Standard ½" pipe thread ports. Overall dimensions 8½" x 5¾" x 7½". Gov't. Acquisition cost $42.00. Shipping weight 28 lbs. An outstanding buy. F.O.B. Chicago .... **15.00**

ITEM #59

**Item #16C**—Double acting hydraulic cylinder, 1½" bore, 26" stroke. Will lift 1760 lbs. with 1000 PSI line pressure. Weight 8 lbs. A $55.00 value. Now only..... **16.95**

ITEM #1036

**Item #6**—Double action hydraulic cylinder, 3" bore, 24" stroke, will lift 7070 lbs. with 1000 PSI line pressure. Steel barrel. 1⅛" stainless steel shaft. Ship. wt. 26 lbs. F.O.B. Chicago..... **28.00**

**Item #1036**—Double acting hydraulic, 3" bore, 36" stroke, ½" pipe thread ports, 1" solid steel shaft. Overall length closed 49", clevis mounting at base and shaft. FEATURES • Cup & Chevron Packing • All Welded Construction • Precision Ground and Honed Construction • ¼" Seamless Steel Tubing Cylinder Case. Weight (net) 57½ lbs. F.O.B. Chicago **50.00**

| PUMP PRESSURE (PSI) | LIFT CAPACITY (LBS.) |
|---|---|
| 500 | 3535 |
| 1000 | 7069 |
| 1500 | 10604 |
| 2000 | 14138 |

**Item #126—Four-way, open center control valve** with built in adjustable relief valve. Factory set at 1000 P.S.I., spring loaded neutral position, for use with one double acting cylinder. In neutral position cylinder is locked and pump unloaded. Fully balanced plunger type, smooth, positive easy operation, can be used as single unit or mounted in series of any combinations desired. Has ¾" pipe thread inlet and outlet. ½" pipe thread cylinder ports. Newly manufactured to our specifications. Shipping weight 8¼ lbs. An outstanding buy! F.O.B. Chicago ... **21.50**

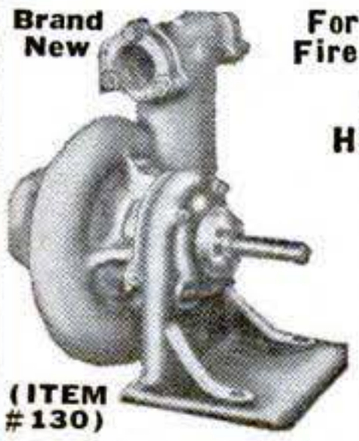
Item #126

**General Motors — Allison**

## CENTRIFUGAL PUMP

### 200 GALLONS PER MINUTE

Brand New



(ITEM #130)

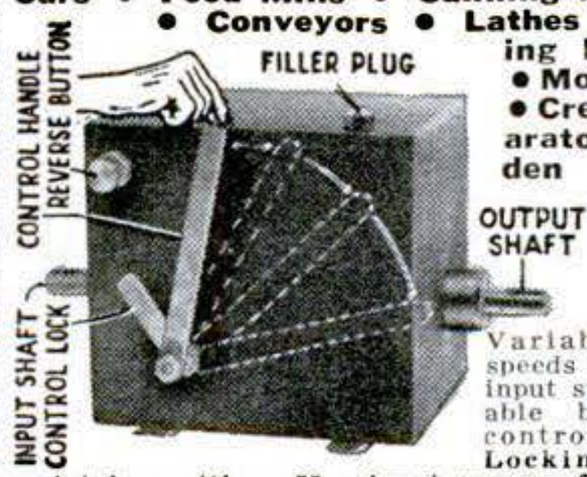
**For Draining Basements**
**Fire Fighting • Irrigation**
**Fuel Transfer**
**Swimming Pools**
**Home Water Systems**
**Dewatering**

Converted for high volume commercial, home, and industrial use. Standard 2½" pipe thread inlet, twin 1¼" pipe thread outlets. Ball bearing supported ¾" shaft. Easy priming. Rotation, counter-clockwise facing shaft. Gov't. acq. cost $145.00. Complete with full instructions. Ship. wt. 35 lbs. F.O.B. Chicago ..... **39.50**

## HYDRAULIC SPEED REDUCER

**ITEM #115 WITH FINGERTIP CONTROL**

**USE FOR: • Reamer Drives • Midget Cars • Feed Mills • Canning Machines • Conveyors • Lathes • Milling Machines • MotorBoats • Cream Separators • Garden Tractors • Pumps**



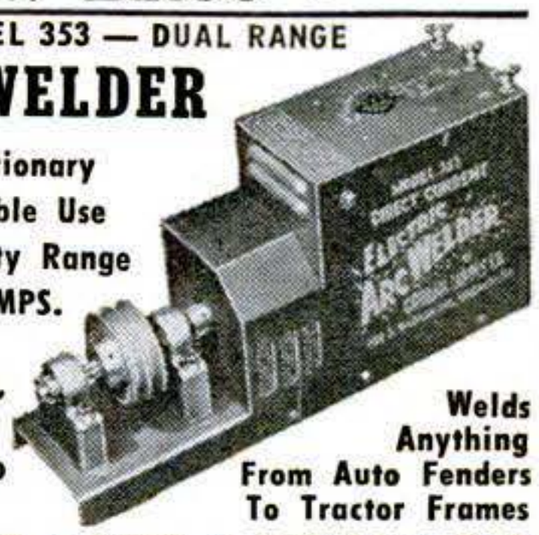

Variable output speeds from 0 to input speed available by moving control handle. Locking handle maintains setting. Use input power of ¼ to 1½ H.P. This Westinghouse-Oil Gear Unit consists of a variable displacement hydraulic pump feeding a fixed displacement hydraulic motor. Adjustable relief valves set at factory for 100 inch pounds of torque may be reset up to 180 inch pounds. Independent reverse control allows full output power and speed selection in either direction of rotation. Shafts measure ⅝" diam., include keyway. Input rotation is counter-clockwise facing shaft. Recommended input speed not to exceed 750 R.P.M. Over-all dimensions, 7½"x7½"x11½". Gov't acquisition cost, $428.00. Ship. wt. 31 lbs. Complete with 2 qts. of oil and full instructions. F.O.B. Chicago **54.50**

NEW MODEL 353 — DUAL RANGE

## ARC WELDER

**for Stationary or Portable Use**
**Heavy Duty Range To 250 AMPS.**

**New 'Magic Terminal' For Low Current 30 to 100 Amps**



**Welds Anything From Auto Fenders To Tractor Frames**

**IDEAL FOR • FARM • GARAGE • FACTORY • WORKSHOP.** These precision engineered D. C. Arc Welders contain the highest quality War Surplus aircraft components built to exacting government specifications. They are light in weight, have oversized lifetime grease-sealed ball bearings, air cooled commentator, dial type rheostat for easy pin-point control, a high-low rheostat switch, reactor coil for even arc and the new 'MAGIC TERMINAL' low current welding range for welding lighter materials. Designed for many years of trouble-free service. Run welder from drive pulley or power take off of a tractor or Jeep, 7½ HP electric motor or 10 HP gas engine at 2500 R.P.M. Uses two V belts or flat belt. Continuous output rating 200 amps. Intermittent welding rating 250 amps, 30 volts. This sensational price includes double V or flat belt pulley and complete operating instructions. Ship. Wt. 107 lbs. $350.00 Value. **Item #65.** Now only.. **119.50** F.O.B. Chicago

## FREE 1953 CATALOG

48 Pages, chuck-full of unsurpassed War Surplus Equipment Bargains for farm, home, factory and workshop. Every item is unconditionally guaranteed. You save on everything! Write today.

**ORDER DIRECT FROM AD — SEND PAYMENT OR PURCHASE ORDER TODAY — SATISFACTION GUARANTEED**

**GROBAN SUPPLY CO. 1139 SO. WABASH AVE., CHICAGO 5, ILL. DEPT. PS-12**



Copyrighted material

# New DOUGLAS FIR PLYWOOD handy panels make this versatile chest easy-to-build

Start it Friday night . . . finish it Sunday. This combination desk, vanity or buffet . . . created by Norman Cherner Associates, one of America's top designer firms . . . is easy to build with real wood panels of Douglas fir plywood—especially with the new, small-size plywood Handy Panels. Why not have a fine occasional piece like this. Send coupon below for complete plans and instructions.

**NOW AT YOUR LUMBER DEALERS IN NEW SELF-SERVICE RACKS**

Fir plywood Handy Panels are about 2x4 feet—easy to handle, easy to select, easy to work. Clearly marked for size, grade and price. Ask your lumber dealer.

**DOUGLAS FIR PLYWOOD handy panels**

**MAIL COUPON TODAY FOR EASY-TO-FOLLOW PLANS**

**Douglas Fir Plywood Association,** (Good U.S.A. Only)
**Dept. 12B, Tacoma 2, Washington**

Please send me plans for Douglas fir plywood desk-chest combination. I enclose 10 cents to cover costs.

Name.....

Address.....

City.....Zone.....State.....


## Bouncing Putty

[*Continued from page 159*]

at any price. Silicone paints, for example, are cutting down the number of repaint jobs required on ships, utility towers and road signs. One paint will shortly be tested on big bridges in New York and California. Prices of these new materials are dropping steadily and, meanwhile, manufacturers are already getting some silicone-paint benefits into our homes by retailing enamels and water-base paints which are fortified with a dash of silicone, to give a smoother finish and improved washability.

### *Millions of Combinations Possible*

The chemists themselves don't know yet how many different kinds of silicones they can make. By altering the silicone chain's molecular architecture, it is theoretically possible to construct millions of organo-silicon compounds. Only a few thousand of these have so far been made. And even the possibilities of these have by no means all been thought of.

A few years ago, for example, someone discovered that certain silicones are the most effective "release agents" yet known. A release agent is the opposite of an adhesive—a substance which prevents materials from sticking to each other.

### *Cleaner Cars and Stickproof Waffles*

Silicone-fluid release agents now keep automobile tires from sticking to their factory molds, with an 80-percent saving on previous scrap and reject costs. In bakeries a single application of a silicone pan glaze will release up to 200 successive bakes from the bread pans. Although such glazes can't be applied in home kitchens, a related home anti-sticker called Pantastic simplifies cleaning sticky food from pots, pans and stove burners.

Alert manufacturers now coat their waffle irons with a silicone release agent before they leave the assembly line. Silicone-treated tissues keep your eye-

[*Continued on page 250*]



Copyrighted material

# FOR EASIER SCRATCH-FREE SANDING . . . . . USE DREMEL STRAIGHT-LINE ACTION SANDERS

## Christmas Gift Idea!

Here's a gift the whole family can **enjoy** and really **use.** Give the handyman of the house a Dremel heavy-duty Model 2000—a professional tool for sanding dry-walls; refinishing woodwork, furniture, panelling; polishing furniture, cars, etc. Dremel Model "A" is a family favorite for polishing, buffing, dozens of household duties and hobby projects; also a relaxing massager. For gifts that will really be used and appreciated, give Dremel Electric Sanders.

## Only Dremel Offers All These Features:

**WORLD'S FINEST FINISHING SANDER**—Patented straight-line (with-the-grain) action duplicates craftsman's hand-sanding motion . . . the **only** way to be sure of super-smooth, **scratch-free** finishes . . . no gouging, no cross-grain swirls or scratches.

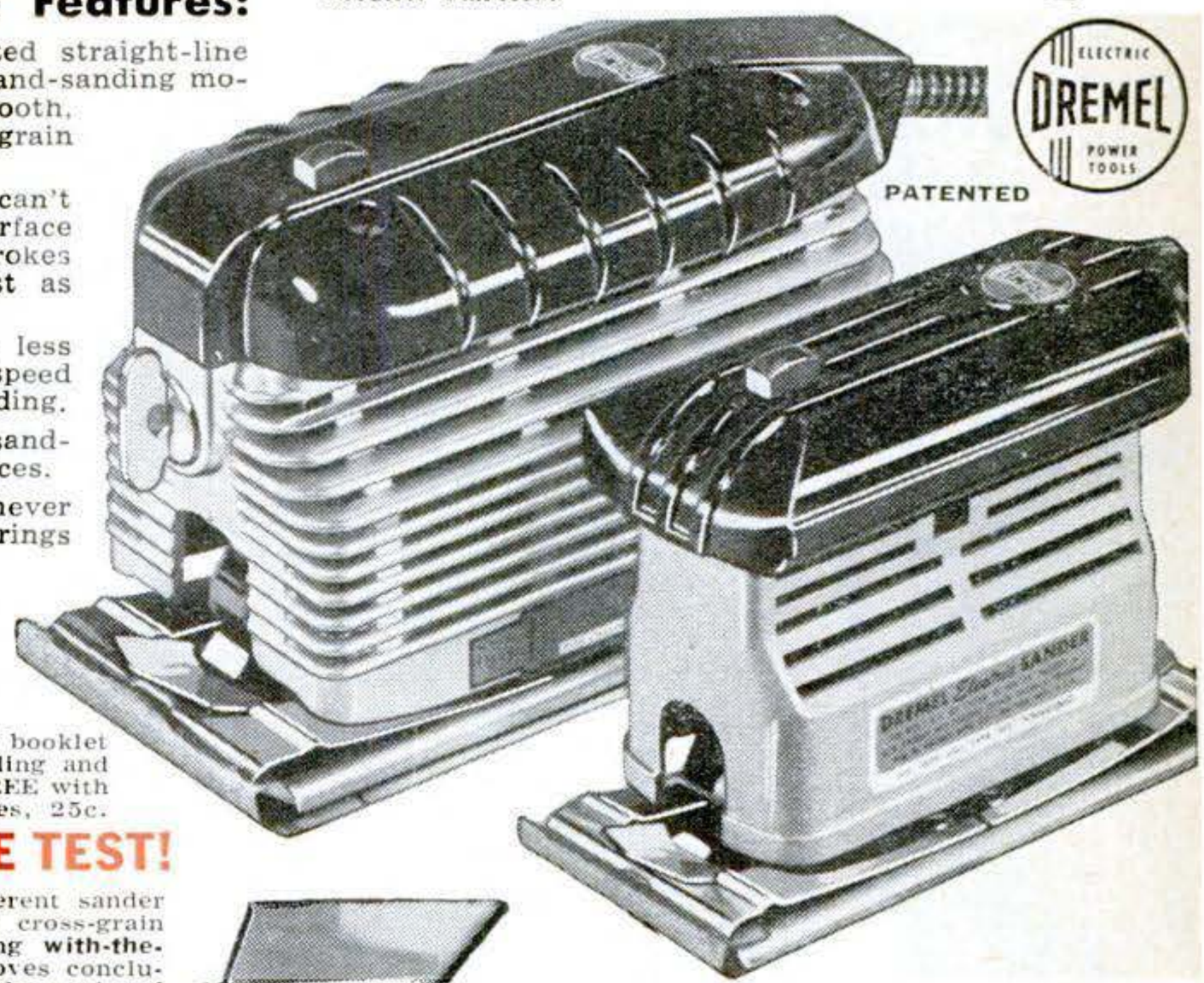
**MORE SANDING SURFACE PER DOLLAR**—You can't beat a Dremel for work! Largest sanding pad surface per dollar cost. Faster action (14,400 working strokes per minute) . . . more than **three times** as fast as most sanders!

**EASY, ONE-HAND OPERATION**—Light weight; less tiring for vertical or overhead sanding; higher speed means less down-pressure required for effective sanding.

**SANDS INTO CORNERS**—Rectangular, over-size sanding pad permits sanding into corners, over tight places.

**TROUBLE-FREE USE**—Only 2 moving parts; never needs oiling. No armatures, brushes, gears or bearings to wear out and replace.

**POWERFUL**—High-speed lifetime reciprocating motor (110 v. 60 cycle AC).



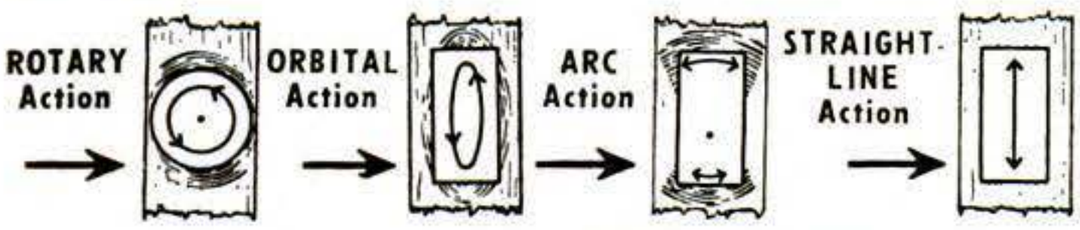

SANDING GUIDE

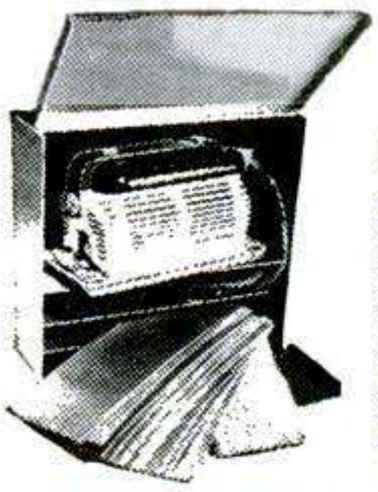
### FREE SANDING GUIDE

A handy, 16-page "How-to-do-it" booklet containing helpful hints on sanding and refinishing procedures packed FREE with each Dremel Sander. Extra copies, 25c.

### MAKE THIS SIMPLE TEST!

Sand a piece of wood, by hand, using the four different sander motions illustrated below. Note how the slightest cross-grain action produces scratches and swirls . . . how sanding **with-the-grain** leaves a scratch-free, satin finish. This test proves conclusively why professional craftsmen **always** sand with the grain of the wood . . . never cross grain. YOU BE THE JUDGE! If you are not 100% convinced that Dremel straight-line action is the finest, most effective sanding method known, we sincerely don't want you to buy.



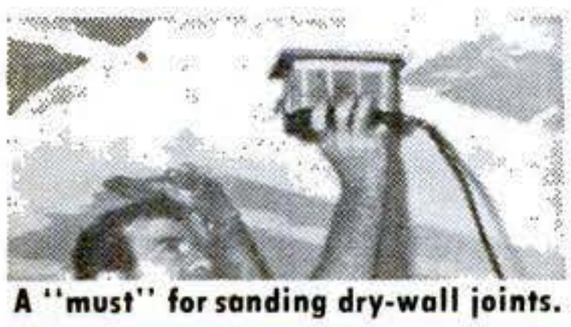



### Model 2000

Heavy-duty model; 21 sq. in. (3⅛"x7") sanding base. Price includes sturdy steel storage case (left) with handy carrying handle; 25 asst'd. abrasives, 1 sheepskin pad..... **$24.50**

### Model "A"

Household and hobby model (above, right); 12 sq. in. (2⅜"x5⅜") sanding base. Price includes 6 abrasives; 1 sheepskin pad; 1 felt pad **$14.85**



A "must" for sanding dry-wall joints.

Fast—cuts refinishing time in half.

Sands right into tight corners.

Prepares furniture for repainting.

GRINDS • CARVES • DRILLS • ROUTS • ENGRAVES • SHARPENS

# DREMEL *Electric* MOTO-TOOL

**FASTEST MOST POWERFUL TOOL IN ITS CLASS—APPROX. 27,000 R.P.M.**

Most practical tool a man can own—more powerful than any similar tool you can buy. Works well in wood, plastics, and metal. For home maintenance jobs you'll wonder how you got along without it. For model making it's a must. And for general shop operations it saves time and money. Compare it, try it, buy it. You be the judge.

**Check These Important Features:** Oilless sealed bearing ● Dynamically balanced armature ● Shockproof, Bakelite housing ● Dust-filtered air cooling system ● Sturdy 110-120 V., A.C.-D.C. motor ● Wt. only 13 oz. ● A precision tool widely used in industry for many years.

**KIT NO. 2.** Includes Model 2 Moto-Tool and 23 Accessories (High-Speed Steel Cutters, Grinding Wheels, Polishers). Packed in sturdy hardwood case..... **$23.50**

**KIT NO. 1.** Includes Model 1 Moto-Tool and 34 Accessories (Steel Cutters, Grinding Wheels, Polishers, etc.). Packed in attractive lacquer-finished wood case ..... **$17.50**

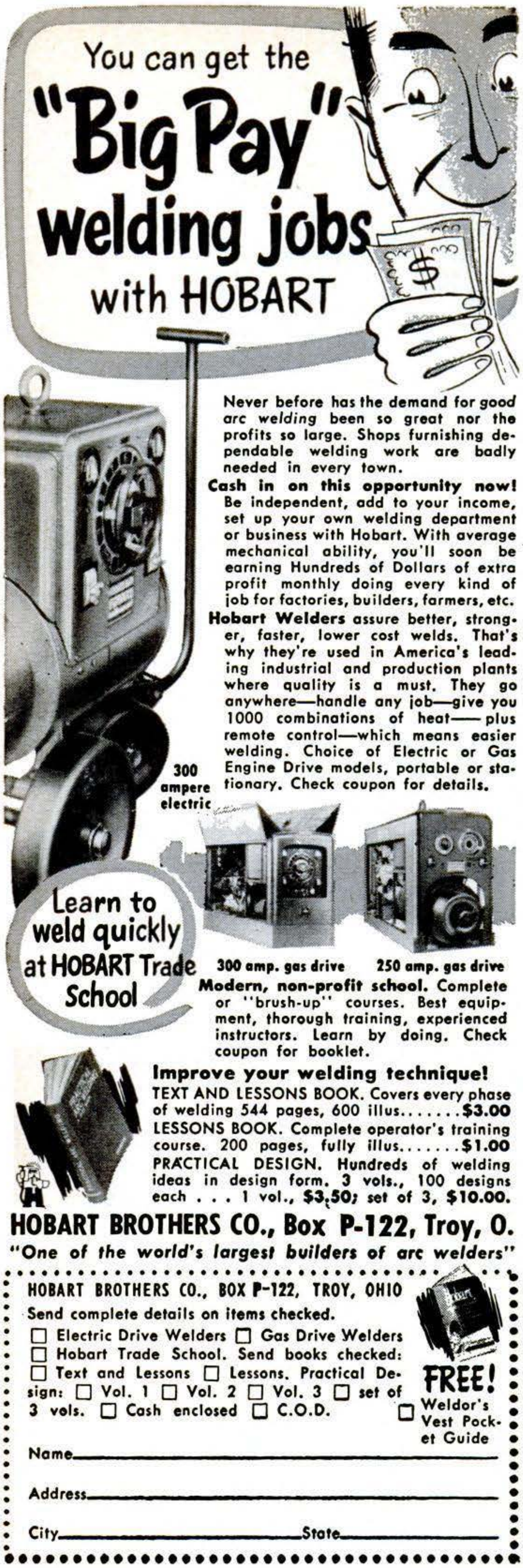
**MOTO-TOOL NO. 2.** Offers more convenience and long life features for the money than any other hand grinder. Thousands of satisfied users. Moto-Tool No. 2 (With 1 emery wheel point) ..... **$16.50**

**SEE YOUR LOCAL DEALER.** Dremel Tools are sold at better dealers everywhere. If your dealer can't supply, order direct on a five day trial, money-back guarantee. Remit in full, and we will ship postpaid. Or, send only $2.00 now, pay postman balance plus postage and C.O.D. fee.

**DREMEL MANUFACTURING CO. Dept. 122-M RACINE, WIS.**



Copyrighted material





## Bouncing Putty

[*Continued from page 248*]

glasses clean, and silicone polishes keep grime from sticking to your car.

Three years ago silicone processors began to market the most effective water-repellents ever developed for above-ground masonry. Paraffins and soaps formerly used for this purpose rarely lasted more than nine months. Silicone treatments applied three winters ago are still sternly excluding water, and tests indicate that they may last eight to 10 years.

### *Clothes That Won't Get Wet*

The same freezing expansion of internal moisture that cracks and erodes home brickwork and stucco is one of the major causes of concrete road deterioration. Tests begun last fall on a heavily traveled Massachusetts road indicate that silicone water repellents may add as much as 10 years to the normal life of a concrete highway.

Relatives of the masonry water repellents work their magic on textiles, too. At General Electric's laboratories in Waterford, N. Y., Dr. Charles E. Reed, who heads up GE's silicone research and production, showed me a square of silicone-treated cotton cloth resembling a pocket handkerchief. He stretched it taut on a small frame, put it under a nozzle and turned on the spray. The water just bounced off and left the cloth as dry as before. Furthermore, the silicone treatment doesn't seal weave openings. It makes the individual fibers "hydrophobic"—water-hating—but leaves the fabric and the wearer's skin free to breathe. That's why silicone-treated clothing is cooler and more comfortable than plastic or rubberized garments.

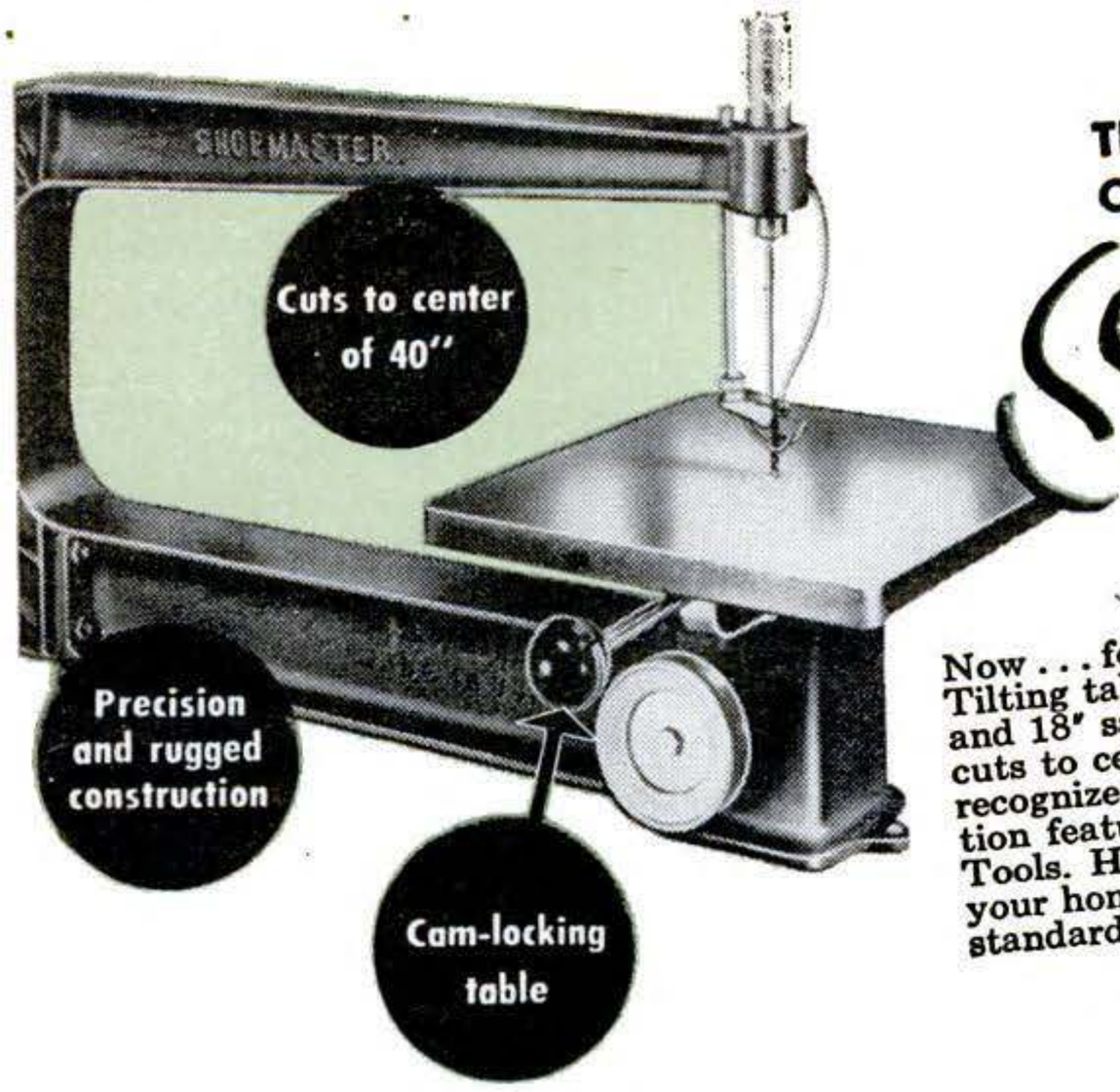
### *Repellents Won't Wash Out*

Silicone water repellents can now be factory-applied, safely and simply, to all types of textile fibers, natural or synthetic—silk, wool, rayon, nylon, even furs. They neither weaken nor discolor the fabric. Moreover, treated materials

[*Continued on page 252*]



Copyrighted material




The Greatest Dollar for Dollar Value On The Power Tool Market Today...

# Shopmaster 20" TILTING TABLE JIG SAW

Now . . . for the first time . . . you can get a 20" Tilting table jig saw for the same price as 16" and 18" saws. Yes . . . a 20" working area on cuts to center of 40" . . . built with the same recognized high quality and rugged construction features of all other famous Shopmaster Tools. Here is one of the necessary tools for your home workshop . . . built to professional standards . . . but priced for the hobbyist.

**Free complete catalog of the famous quality Shopmaster tools and accessories . . .**
**Write Department PS-12**
**1214 Third St. South • Minneapolis, Minnesota**

## Other famous TOOLS

10" Tilting Arbor Saw

20" Table Size Saber Saw

Table Size Spindle-shaper

8" Tilting Arbor Saw

Belt and Disc Sander

12" Drill Press

10" Swing Wood Turning Lathe

12" Tilting Table Band Saw

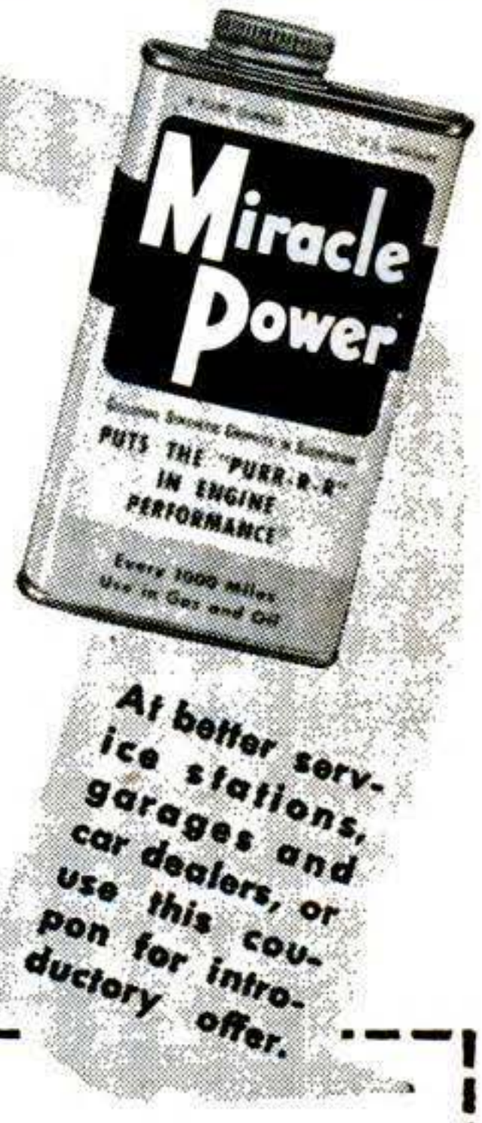
# Don't Let Your Engine Get Old This Winter

Mechanics know that most engine wear occurs in winter. That's because oil is cold, stiff, slow to get around to all moving parts. So you have longer periods of DRY STARTING which causes loss of performance and eventual repair bills.

That's why mechanics say, "Use Miracle Power in gas and oil." Miracle Power contains colloidal synthetic graphite in suspension. This graphite forms a breathlike, protective film on engine surfaces . . . lubricates instantly . . . provides a better compression seal.

Result: You keep your engine young—it starts easier, has more power, uses less gas and oil.

Protect your car this winter—it may have to last you longer than you think. Try Miracle Power next time you get gas.




*Miracle Power Division*
THE AP PARTS CORPORATION
853 AP BUILDING, TOLEDO 1, OHIO

## Now! Push Button Lubrication!

Miracle Power Pres-A-Luber is ideal for car engines as well as general household lubrication. Just push the button for a fine Miracle Power spray that reaches all the hard-to-get-at places.

Also available are Pres-A-Lubers containing dgf 123—companion product to Miracle Power for use as a dry pre-lubricant during engine re-assembly.

THE AP PARTS CORPORATION
853 AP BUILDING, TOLEDO 1, OHIO

Enclosed find $.....for which please send me *postpaid:*

..... trial cans of Miracle Power at 75c each (1 for gas, 1 for oil)
Please send me free literature on making my car last longer.

Name_____

Address_____

City_____ Zone_____ State_____

© The AP Parts Corp., 1952




Copyrighted material

[Continued from page 250]

keep up to 90 percent of their water repellency after repeated machine washings or many dry cleanings.

The cost of the silicones needed to treat enough cloth for a man's suit is less than 25 cents.

Silicone-treated raincoats and snowsuits are already on sale. Fast-drying umbrellas, bathing suits, convertible-auto tops, rain-shedding everyday garments will follow soon. And Dow-Corning is working on a water repellent for shoe leather which should measurably allay motherhood's eternal concern over little wet feet.

### *Even Waterproofs Skin*

Businessmen are already finding the silicones' endless versatility a key to all sorts of new businesses. In 1945 a Wisconsin fishing enthusiast named Richard L. Talbot decided to try a water-repellent silicone coating on his dry flies and fly lines instead of the bear-fat concoctions he had been using. Finding it superior to any water repellent on the market, he quit his job and went into business putting up and selling a dry-fly liquid trade-named Silicote.

With two infants, Talbot's wife was constantly washing baby clothes. One day in desperation she decided to waterproof her hands, which had become raw and irritated. She rubbed her husband's silicone dressing on them every day for a week. Her skin irritation disappeared.

Cautiously she tried the silicone on her children's diaper rash. The rash vanished overnight, and soon Talbot's Silicote fly-line dressing was dressing more babies' bottoms than fishing lines.

Doctors of the University of Wisconsin Medical School reported last year, in *The Journal of Investigative Dermatology,* that Silicote had cured or controlled

[Continued on page 254]


# MOST POWERFUL SAW *of its kind!*

Very Quiet Operating!

New!

Patented

**Cuts 1" Soft Wood, Thin Metal, Plastic!**
**Ideal for Cutting TILE of Rubber, Linoleum, Metal!**

Syncro's newest Electric Jig Saw—No. 201—is so powerful it cuts 1" soft wood—so quiet operating it's ideal for apartment as well as workshop use. Smooth cutting eliminates sanding! PORTABLE. Stroke adjustable! Arm adjusts for any length cut! Thousands used in schools, hospitals, homes. Get this sturdy, quality, precision-made tool with new BUILT-IN Reactance Electric Motor, only $24.95 at dealers or postpaid from factory. Saw GUARANTEED by World's Largest Makers of this type saw!

**NEW RED ROCKET JIG SAW!**

Amazing! The new safe jig saw for children that cuts ½" soft wood, thin metal—SAFELY. Train your child to use tools safely with SYNCRO RED ROCKET. Motor Built-In, only $14.95 dealers or postpaid from factory.



No. 501
$14.95

No. 201
$24.95

SYNCRO Electric Jig Saws

No Sanding Necessary . . . Sands as It Cuts!

Power Unit Guaranteed Against Burn-Out during OWNERSHIP or Replaced FREE!

COMPLETE with new BUILT-IN Reactance Electric Motor

SYNCRO CORPORATION • DEPT. G-522 • OXFORD, MICHIGAN




Copyrighted material

# SURPLUS MACHINE SHOP TOOLS AT PRICES YOU CAN AFFORD

## HIGH SPEED STRAIGHT SHANK DRILLS

**SET 6H** 30 selected H. S. Straight Shank Drills from 1/8" to 1/4", lengths up to 7". $15 value, only **$2.98**

**SET 19H** 100 HIGH SPEED DRILLS: 1/4" down. 30 new std. H. S. Drills — 70 slightly used sharp drills, lengths up to 7". $30 value. PPD. Only..... **$7.98**

**SET 7H** 12 Different size H. S. straight shank Drills. 1/4" to 1/2", lengths up to 7". Only..... **$3.98**

## HIGH SPEED DRILLS

**1/4" TO 17/32" WITH 1/4" SHANKS!**

**SET 35H** 6 different size H. S. Drills, 1/4" to 17/32" all with 1/4" shanks. PPD..... **$2.98**

**SET 36H** 10 of above, PPD..... **$4.95**

Sets 35H and 36H will fit any 1/4" drill.

## HIGH SPEED DRILLS

**1/2" to 1-3/16" WITH 1/2" SHANKS!**

5 Drills for less than the price of one new Drill!

**SET 32H** 5 different size H. S. Drills 1/2" to 1-3/16"..... **$7.95**

**SET 33H** 10 different size H. S. Drills 1/2" to 1-3/16".. **$14.50**

These new and used H. S. precision Drills with 1/2" shanks can be used in a 1/2" elec. drill or a 1/2" capacity lathe or drill press.

## HIGH SPEED MORSE TAPER SHANK DRILLS

**SET 9H** 15 Different Size High Speed Morse Taper Shank Drills up to 9/16" with No. 1 and 2 tapers. New and used. $50 value. Priced at only..... **$6.49**

**SET 10H** 20 Different Size High Speed Morse Taper Shank Drills from 1/4" to 1". New and used. $70 value. Priced at only..... **$12.95**

**SET 15H** 10 Different Size High Speed Morse Taper Shank Drills from 1/2" to 1 1/4". New and used. $50 value. Priced at only..... **$9.95**

**SET 37H** 8 Different Size High Speed Morse Taper Shank Drills from 1" to 2" with No. 3, 4, and 5 tapers. New and used. $125 value. Priced only..... **$29.95**

## NEW MOUNTED STONES

**SET 27H** Mixture of 12 Mounted Stones with 1/4" shanks. PPD.... **$2.95**

## HIGH SPEED WOODRUFF KEY SEAT CUTTER

**SET 4H** 5 different size cutters. Can be used as mounted milling cutter or circular saw. All with 3/8" and 1/2" shanks, widths up to 1/4", dia. up to 1". New and used. Ppd. Priced at only.... **$3.95**

## NEW ROTARY FILE MIX

7 different pcs., High Speed 1/4" shank, PPD. . **$4.49**

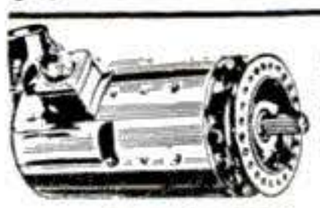
**SET 22H** 14 different pcs. as above, PPD. .... **$8.79**

## H. S. TAPER SHANK CHUCKING REAMERS

**SET 25H** 15 Different Size High Speed Morse Taper Shank Chucking Reamers up to 1/2" with No. 1 and 2 tapers. New and used. Priced at only..... **$7.95**

**SET 13H** 8 Different Size High Speed Morse Taper Shank Chucking Reamers from 1/4" to 1". New and used. Priced at only. **$6.95**

## GENERATORS!



P1 GENERATOR 200-amp. 24-volt, continuous duty. Wt. 48 lbs. Special closeout price. F.O.B. Tulsa..... **$14.98**

E5A GENERATOR: 50-amp. 12 volt continuous duty. Wt. 21 lbs. F.O.B. Tulsa. Only..... **$9.98**

These used, guaranteed serviceable aircraft quality generators are easily convertible for welders, power plants, boats, platers, etc.

2 H. P. MOTOR 24-volt, 90-amp. double end ball-bearing shaft. Wt. 18 lbs. F.O.B. Tulsa, only..... **$7.00**

## NEW HIGH SPEED COMBINATION DRILL AND COUNTERSINKS

**SET 2H** 8 selected sizes from A1 to F2 (3/64" drill x 1/8" body to 3/16" drill x 7/16" body) 60° angle of countersink. New cost on these countersinks 75c to $2.50 ea. Priced to you Ppd. at only..... **$3.98**

24-VOLT TRANSFORMER: 110-volt A. C. to 24-volt. 3 amps. Just the thing for small 24-volt motors..... **$1.95**

## HYDRAULIC BARGAIN DEPT.

*New Hydraulic Hose!!*
2000-lb. Test

| Length in feet | Price 1/4" ID |
|---|---|
| 1 | $ .75 |
| 2 | 1.00 |
| 3 | 1.20 |
| 4 | 1.45 |
| 5 | 1.70 |
| 6 | 1.95 |
| 7 | 2.30 |
| 8 | 2.55 |
| 9 | 2.80 |
| 10 | 3.00 |

- Any Length
- 1/4" Std. Pipe Connections

1/4" Hose has 1/4" male pipe connections. 11 to 50-ft. lengths available at 20c per foot. Above prices quoted complete with fittings. Finest construction double wire internal braid. Carries 3 GPM at 1000 PSI. Discounts on large quantities.

## PESCO HYDRAULIC GEAR TYPE PUMP

Rated at 3 GPM, 3750 RPM, 1500 PSI. 1/2" drive spline. Gov't cost over $90. Yours for only..... $9.49

## BARGAIN TOOL & SHOP MIXES—PPD.

- 30 GRINDING WHEELS 1/4" arbor, 4" diameter max..... **$3.29**
- 2—8" WIRE WHEELS coarse and fine, 1" thick, 5/8" bore. Pair only..... **$2.29**
- 300 SPRINGS all types and sizes..... **$1.79**
- 100 MOUNTED POINTS 1/8" and 3/32" shanks. Various shapes **$8.98**
- SURPRISE MIX: Over 50 pcs. for your 1/4" elec. drill including rotary files, drills, bits, reamers, grinding wheels and arbors for our customers who like pleasant surprises. Your money back if you aren't satisfied..... **$2.98**
- BEARING MIX: About 40 needle, ball and roller bearings; new and used. Up to 2 1/2" dia. approx. 5 lbs. Outstanding buy at..... **$2.95**
- RIVET MIX: 5 lbs. assorted rivets; cherry, explosive, etc. Hundreds of rivets..... **$2.29**

## 6 SLITTING SAWS WITH MANDREL

**SET 34H** 6 Different Size High Speed Slitting Saws, 5 pcs. 2 3/4" dia. x 1" arbor, plus 1 pc. 5" dia. x 1/2" arbor. Thickness from .040 to .071. Cuts wood, aluminum, brass, steel, etc. PLUS SPECIAL MANDREL which enables use of saws in 1/4" or 1/2" elec. drill. $25 value. PPD. Only..... **$4.95**

7 selected, sharp H. S. Slitting Saws as above to use on your own mandrel or milling machine. New and used. PPD. A bargain at..... **$4.95**

Money-Back Guarantee On RECEIPT of Merchandise. All mdse. mixture of new and reconditioned unless specified new. All orders (Except those specified F.O.B. Tulsa) are shipped Post Paid, saving you up to 25% on total delivered cost!

Write For Free Catalog Describing Thousands of Bargain Cutting Tools.

**T & T TOOL** 221 W. SECOND TULSA, OKLA.

---

U. S. Patents
No. 2,351,906
No. 2,461,872

# *Save Fingers* with

To be Sure of the Genuine Demand This Trade Mark

## Steel-Grip Finger Guards Lower Your Hand Protection Cost

Hundreds of factories save time and injuries by protecting workers with Steel-Grip Open End Finger Guards. For handling rough, sharp articles, buffing, grinding, sanding, punch press work, and hundreds of other jobs. Protect fingers or thumbs, front or back, from cuts, abrasions or blisters. Various designs in leathers and other materials; elastic web back for snug, cool, comfortable fit. Sizes for men and women. Send 10¢ for sample. *Catalog of Safety Apparel Free.*

**INDUSTRIAL GLOVES COMPANY**
A Corporation
**1420 Garfield St., Danville, Ill.**
(In Canada, Safety Supply Co., Toronto)

**FAMOUS INDUSTRIAL SAFEGUARDS SINCE 1910**

---

# U.S. GOV'T CLOSEOUT *Wire*

**THIS WIRE HAS NOT BEEN OVERSEAS**

This high quality two conductor communication wire offered in No. 18 and No. 22 gauge is ideal for intercoms, lead-ins, telephones, indoor and outdoor speaker extensions, doorbells, signal and burglar alarm systems, shot firing, etc., etc. **SAMPLES ON REQUEST.**

*NEW WAR SURPLUS*
Mfgd. to rigid Signal Corps specifications

**U. S. Signal Corps Communication Wire**
TWISTED TWO CONDUCTOR No. 18 STRANDED per 1000 ft. $5.00
$7.50 per 1300 ft. TWISTED TWO CONDUCTOR No. 22 STRANDED

## Won't Last Very Long at These Prices

**Stock Up Now—Subject to Prior Sale—Order Today**

**W-110-B—TWO CONDUCTOR #18 STRANDED** (four steel and three copper strands) rubber covered plus weatherproof cotton braid and twisted. 5,280 feet per steel reel. **Only $3.50 per thousand feet on 5,280 foot reels or $18.25 per reel.**

**W-130—TWO CONDUCTOR #22 STRANDED** and twisted (one copper and six steel strands) in your choice of rubber or plastic insulation. 10,000 feet per steel reel. **Only $3.50 per thousand feet on 10,000 foot steel reel or $35.00 per reel.**

**(Note: Steel strands are incorporated for extra tensile strength and are tinned and treated for efficient conductivity.)**

All these way below market prices, our stock will not last long. Take advantage of this exceptional closeout and **STOCK UP NOW!**

Prices F.O.B. Chicago. Include approx. postage on orders paid for in advance. C.O.D. orders enclose 25%, balance sent C.O.D.

**U. A. S. Corp.** Dept. PS-12 5637 W. 63rd Pl. Chicago, Ill.



Copyrighted material

# HERE'S BIG NEWS!

'ARCO SAW' NEW LARGER MODEL CUTS thru 2x4's with QUICK CUTTING 5" 'ARCO SAFECUT' SAWBLADE.

AT BETTER HARDWARE STORES EVERY-WHERE

$9.95 UP AVAILABLE IN FOUR MODELS TO MEET EVERY NEED! (See Complete Price List Below)

ATTACHES IN ONE MINUTE TO ANY 1/4" ELECTRIC DRILL

CUTS 8-TIMES FASTER THAN A HANDSAW!

Now, here is the first gear driven saw attachment for electric drills that will go through 2x4's in **one easy cut.** Comes equipped with a 5-inch "ARCO SAFECUT" Sawblade—the smoothest, fastest cutting sawblade made. Whizzes through lumber, plywood, wallboard, etc.

**ONLY "ARCO" GIVES YOU THESE FEATURES:**

**5-inch "ARCO SAFECUT" SAFETY SAWBLADE**—uses 30% less power, allows, small drill to cut thru heavy wood. **Precision Graduated Depth & Bevel Gages** for cuts to 1¾" in depth, bevels from 0 to 45°. **Adjustable Rip Gage** for accurate strips. **Adjustable Visual Guide** (not shown) for straight & bevel cuts. **Sturdiest, Most Easily Adjusted Safety-Yoke** for absolute safety, keeps drill steady & vibration-free. **Worm Drive Clamp** releases drill in seconds for other work. **Precision Gear Box with Steel Gears. Self-lubricating Lifetime Bearings. 90-DAY FACTORY GUARANTEE.**

**No. 455 "ARCO-SAW"** (shown above) with ALL GAGES & 5" SAFECUT Blade. MAX. CUT: 1¾".. **$12.50**
**No. 454 "ARCO-SAW".** Same as above, less gages. Has accurate Visual Guide. MAX. CUT: 1-15/16".. **$10.95**
**No. 445 "ARCO-SAW"** with ALL GAGES & 4" "HYCARBON" Crosscut Blade. MAX. CUT: 1¼".. **$11.50**
**No. 444 "ARCO-SAW".** Same as No. 445, less gages. Has accurate Visual Guide. MAX. CUT: 1-5/16".... **$9.95**
**REPLACEMENT BLADES:** Specify Safecut, or Combination, or Rip, or Crosscut Style { 5" BLADE... $1.75 / 4" BLADE... $1.60

NEW! 'ARCO STAND 'N TABLE'

MAKES A WORKSHOP OUT OF EVERY 1/4" ELECTRIC DRILL!

HAS TILTING TABLE FOR Sanding, Grinding, Buffing, etc.

No. 400 $7.95

*Sturdy Aluminum Castings hold complete unit vibration-free, allows operator to use both hands.*

Consists of strong **Drill Stand** with Worm Drive **Clamp** and adjustable **Table.** Tilts to 45°, adjusts up or down for various jobs. Rubber cushioned **Sander** for beautiful sanding, can also be used in drill alone or drill press. **6 Sanding Discs and "Speed Cement".**

**No. 401 "ARCO STAND"** consists of Drill Stand & Worm Drive Clamp only..... **$2.75**

NEW! 'ARCO SAFECUT' SAFETY SAWBLADES

**The Safest, Fastest Cutting Sawblade Ever Made!** Made of finest tempered tool steel. No "Kick-back" accidents — cannot drag hand into blade. Easily & quickly resharpened with ordinary handfile.

6" Blade...$1.75 7" Blade...$1.95 8" Blade...$2.15

**Special Bores for Skil, Mall, B&D Saws—Add 30c**

**10-DAY MONEY BACK GUARANTEE ON ALL ITEMS**

DEALERS: Write for nearest jobber

**BUY THE BEST**—see your hardware dealer now! Don't accept inferior substitutes—if not available send us check or M.O. (Postpaid). C.O.D.'s—postage extra.

**ARROW METAL PRODUCTS CO.**

Dept. PS-12, 140 WEST BROADWAY, N. Y. 13, N. Y.



CHOOSE FROM PROFESSIONAL QUALITY

# WESTCRAFT TOOLS

AT WESTERN AUTO


## Bouncing Putty

[Continued from page 252]

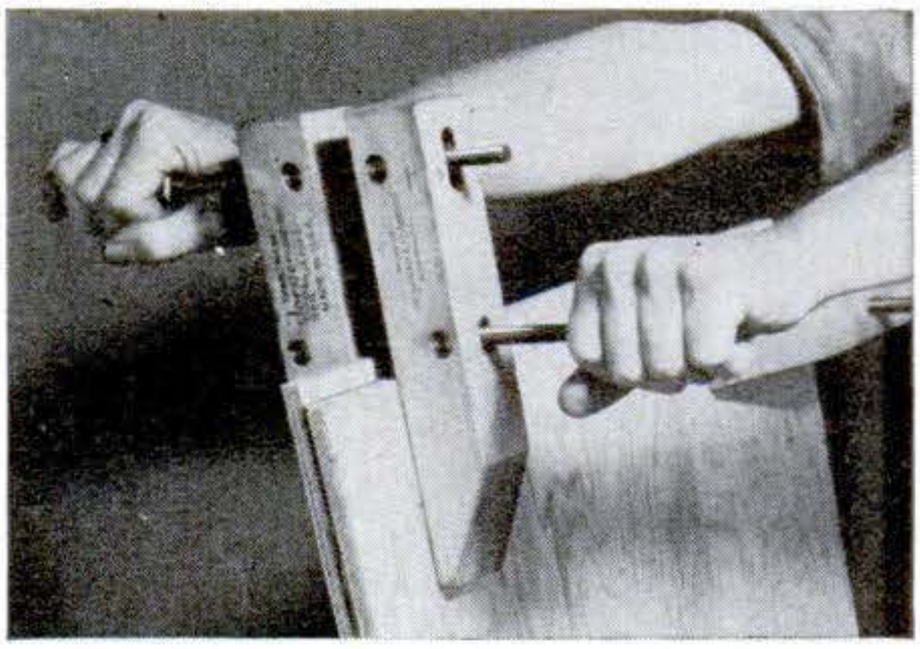
58 of the 61 cases of stubborn externally caused skin irritation they tried it on.

In other ways, too, the silicones' unique talents make them a valuable new weapon in the medical arsenal. In Cambridge, Mass., two doctors have perfected a new "artificial kidney" far more compact than the huge, unwieldy devices formerly used. In cases where normal kidney function may be temporarily interrupted, the patient's blood is piped through a silicone-coated glass chamber where it is cleansed of poisons normally excreted through the kidneys. The silicone—a water repellent—retards the rapid, and in this instance dangerous, clotting normally caused by blood's contact with uncoated glass surfaces. Blood banks use the same silicone on bottles, tubes and syringes.

Other dramatic uses for the silicones will soon emerge from laboratory experiments now going on. But the evidence today indicates that this fascinating new material will prove to be one of the most versatile and useful gifts which science has bequeathed us. END

*Next Month . . .*

## All About Glues and Gluing



Expert glue joints are the heart of good woodworking. Next month PSM will publish one of the biggest and most thorough-going articles we have ever run—a study on what glue to use for every job, how to use it most efficiently, and what short cuts you can and cannot take. Special associated articles will tell you about joint fit-up, clamping, and ways to lick gluing problems. Don't miss "All About Glues and Gluing."



Copyrighted material

# BUILD YOUR OWN POWER TOOLS—TILT/ARBOR SAW

BANDSAW

BELT SANDER

SAVE $50. OR MORE

**Exclusive GIL-BILT Build-It-Yourself Features**

- No machining—build easily with hand tools only
- No blueprint reading—step-by-step pictorial plans, full scale patterns, actual photographs
- Sturdy wood, aluminum and steel construction
- Capacity and performance of commercial saws selling for $60 and up

## GIL-BILT 10-INCH TILTING ARBOR SAW

- 27x28 in. table, 13½ in. capacity in front of blade
- 10 in. blade cuts 3¼ in. deep, tilts full 45 degrees
- Floor model 34" high, table always stays level
- New Departure ball bearing arbor, ¾" precision shaft turned down for ⅝" bore blades, alum. housing, shipped ready to run
- Jackscrew and 4½ in. dia. handwheel lowers and raises blade
- Cast aluminum miter gauge and self-aligning rip fence guide

GIL-BILT Metal Parts Kit includes Plans, ball bearing arbor, miter gauge and bar, rip fence guide, dado insert, lock knobs, jack screw mechanism and handwheel, and all other metal parts (less blade).....$21.95
Same Kit with 10" Combination Blade...$24.90
Same Kit with 8" Combination Blade....$23.90

## GIL-BILT 12-INCH BAND SAW

- Cuts to center of 24 inch circle
- Handles stock up to 6 inch thick
- 18x18 inch table tilts 45 degrees
- Lower wheel and drive pulley runs on sealed New Departure Ball Bearings; Upper wheel runs on two ⅝" bore Oilite Bronze bearings.
  - Upper wheel tension and tilt mechanism of cast aluminum, completely assembled
  - Upper and lower blade guides. Each has ball thrust bearing, self-lub bronze jaws
  - Rigid cast aluminum wheels fully machined ready-to-install. Heavy rubber tires.
  - Uses standard 78 inch blades up to ⅜ in. wide
  - Fully enclosed mechanism for utmost safety

GIL-BILT Metal Parts Kit includes Plans, rubber tires, aluminum wheels, ¼ in. blade, ball bearing spindle, tilt mechanism, blade guides, table tilt segments, and all other metal parts.....$21.95

Return Kits in 10 days for refund if not satisfied.

*(Prices include postage within 300 miles. Over 300 add 5%)*

**Also available—Plans and Parts Kit for 18" Band Saw, Belt Sander and 8" Tilt/Table Saw. Order Plans at $1.00 each—Sent postpaid anywhere in the world or write for FREE descriptive catalog.**

**GILLIOM POWER TOOLS** P.O. Box 1-VM, Lambert Field St. Louis 21, Missouri

---

# Experts' Painting Tips - FREE

Lifetime of experience with aluminum paint, yours free—write for free 24-page illustrated book. Tells how to buy and apply right kinds of aluminum paint. We don't make paint but have prepared this to help you get best results. Just write for "Paint it Bright."

**ALUMINUM COMPANY OF AMERICA, 1717M GULF BLDG., PITTSBURGH 19, PA.**

---

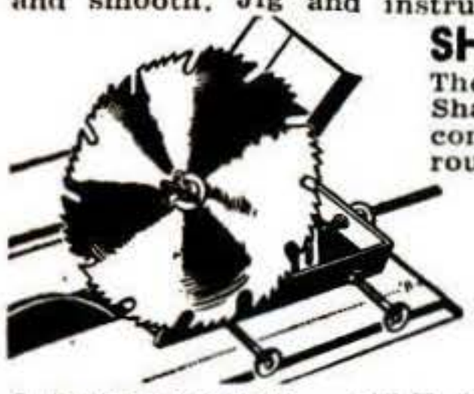
## NEW, IMPROVED CALCULATOR FOR WOODWORKERS only 25c

Instantly gives information on lumber, nails, concrete mixes, painting materials, etc. Convenient, simple to read. Just set dial for nail specifications, to convert linear to board feet, find bit sizes for screws, compare characteristics of woods. 6" diameter heavily varnished cardboard. Send 25c, no stamps, please to Greenlee Tool Co., 2132 Columbia Avenue, Rockford, Illinois.

---

## FILE SAWS THE RIGHT WAY

**SO EASY:** With this new filing jig and jointer anyone can now sharpen any handsaw like new! When file hits hardened steel rollers teeth are finished and EXACTLY SAME HEIGHT. All teeth cut and saw runs true and smooth. Jig and instructions **$2.95** postpaid. Free literature.



## SHARPEN YOUR CIRCULAR SAWS

The RIGHT WAY on your own saw table. Sharpens rip, cutoff, hollow ground and combination blades—6" to 10". Saws stay round with correct bevel. Precision made, easy to use. GUARANTEED. Only **$8.95.** Includes $3.00 Grinding wheel. **"TRU-CIRCLE"** saw set automatically sets teeth at 10° or more **$2.95.**

**AT DEALERS OR POSTPAID**

**A. D. McBURNEY 317 E. 4th St., Los Angeles 13, Calif. Dept. S-24**

---

**For the man who wants a Professional Sander**

**B&D Utility No. 44 Sander only $46.95**

—Many *exclusive* features! Orbital motion insures a "satin-smooth" finish; 10 times faster than hand-sanding. Priced below comparable tools!

**For the man who wants a Tool of 1001 Uses**

**B&D Utility 5" Sander-Polisher only $32.95**

—Extra-powerful, extra-speedy. Comes *complete* with ¼" Jacobs drill chuck, sanding discs, polishing bonnet, rubber pad, wax, auto polish! Also grinds, sharpens, etc.

**For the man who wants his First Power Tool**

**B&D Utility ¼" Electric Drill only $22.95**

A handy, high-quality tool at a popular price! Drives many low-cost attachments to drill, sand, polish, grind, sharpen.

*Bob Davis* **says:** Whether you're giving a gift or buying for yourself, *choose the brand experts prefer*... BLACK & DECKER ... and get a real tool, *not* a toy! WRITE TODAY for free book of job tips to: THE BLACK & DECKER MFG. Co., Dept. H12S Towson 4, Md.



**Black & Decker**

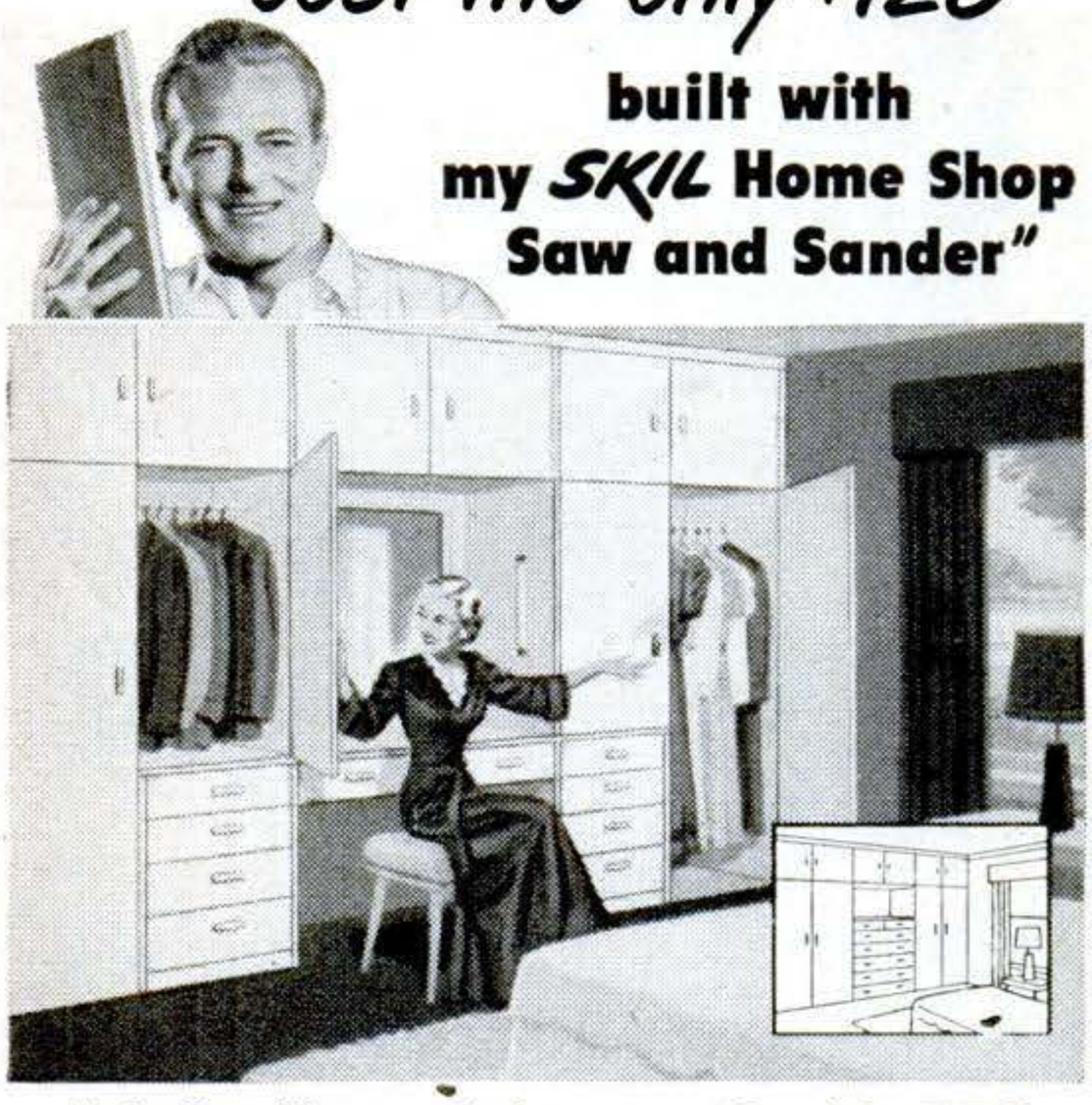
ELECTRIC UTILITY TOOLS

**PORTABLE ELECTRIC TOOLS**



Copyrighted material

"This $435 wardrobe cost me only $123*

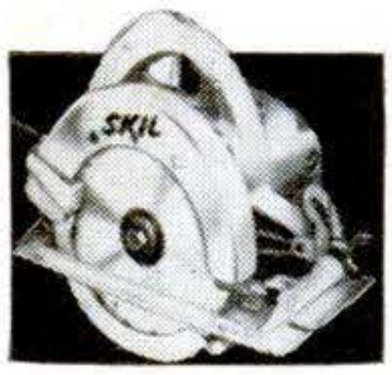


built with my SKIL Home Shop Saw and Sander"

I built this wardrobe *myself,* with SKIL Home Shop Tools. Saved $312 and had a wonderful time! SKIL Chart No. 111 showed me how to do it.

A SKIL Home Shop Saw and Saw Table makes fun out of jobs like this because it's simple to bevel, miter and rip even heavy lumber. All adjustments are simple and quick. And—the SKIL Sander smooths even the roughest lumber. Light weight and perfectly balanced with plenty of reserve power.

Whether *you* choose to build a new wardrobe or any other project, SKIL Home Shop Tools quickly pay for themselves. What's more—there's *nothing* to match your feeling of accomplishment. Send 10¢ and coupon below—now—for complete instructions.



**SKIL Deluxe Home Shop Saw—** Model 586. $59.50. 6" saw. SKIL Saw table and accessories easily convert this saw to tilting arbor bench saw, sander and shaper.

SKIL Home Shop Belt Sanders $68.00

*Price includes materials only, and varies locally. Tool prices subject to change without notice.

SKIL HOME SHOP TOOLS

**Made only by SKIL Corporation,** *formerly SKILSAW, Inc.*
**5033 Elston Avenue, Chicago 30, Ill.**
In Canada: Skiltools, Ltd., 3601 Dundas Street West, Toronto 9, Ont.

**SKIL Corporation, Dept. D-122**
**5033 Elston Ave., Chicago 30, Ill.**
I enclose 10¢. Please send SKIL Chart No. 111 showing how to build the above built-in wardrobe.

Name_____

Street_____

City_____ State_____

## Teacher Shouldn't Be Tough on Learners—Too Soon

How do kind or harsh words from an instructor affect a man's success in learning a task? And what happens if he believes that little, or much, depends upon his making a good showing?

Two Johns Hopkins psychologists, Drs. Richard S. Lazarus and James E. Deese, learned interesting answers to these questions from coordination tests they gave last summer to four groups of enlistees at Lackland Air Base, Tex.

Their findings indicate that a tough, blustering top sergeant or a bullying factory foreman can be bad medicine for a man trying to learn a skill. But once the novice has learned his task, a few harsh words may actually improve his performance.

Members of the first group were asked to take the test simply as a favor to the scientists. Otherwise their scores were of no importance, and would not appear on Air Force records, they were told. Treated casually, they performed well.

The second group's members were told that the test was extremely important, and that their whole military careers hinged upon how well they did. At first these men were flustered. But they soon caught up with the first group, and results were about the same.

### *Third Group Gets the Treatment*

Likewise, members of the third group were led to believe that the test was very important. In addition, early in the test, the psychologists heckled them with such remarks as "You're a flop, soldier," or "I've never seen such rotten coordination." Their performance was comparatively poor.

"We apparently impaired their learning of the task and they never recovered during the 50 tries allowed," Dr. Lazarus says. This could mean that a green recruit, given a bawling out during his first target practice, might have trouble ever becoming an expert marksman.

The fourth test group received exactly the same treatment as the third—except that the psychologists' unkind comments came late in the test. Surprisingly, this group performed better than all the others. "By the time we started badgering these men," says Dr. Lazarus, "they had practically mastered the task, and our sarcasm seemed to give them an extra push."



Copyrighted material

# GIVE and get MILLERS FALLS TOOLS THIS CHRISTMAS

**A basic tool** for every handyman. Millers Falls No. 77A Hand Drill. $3.30

**A beautiful new tool** with unbreakable glossy red "Tenite" head and handle. No. 1950 Bit Brace. $4.80

**Cuts Most Anything** — most anywhere. Millers Falls No. 725 "Nest of Saws." $2.95

**Makes light work** of hundreds of jobs. Millers Falls amazing new No. 966 Sander-Polisher. $37.50

**A tradition** among fine planes. Millers Falls No. 14 Jack Plane. $8.30

**Handiest way** ever to bore small holes. No. 100 Automatic Drill. $4.00

**Passport to fun** and a profitable hobby. Millers Falls No. 106 Carving Tool Set. $4.60

**For men who like** to do things fast. No. 29X Screw Driver with 4 attachments. $3.80

At hardware stores everywhere, you'll find these and many other fine Millers Falls tools in colorful Christmas boxes. They're perfect gifts for the men and boys on your list. Wonderful, too, to receive yourself. Pick out the ones you'd like and drop a hint to your family. They'll appreciate the tip. Free circular on request.

**Prices slightly higher in the West*

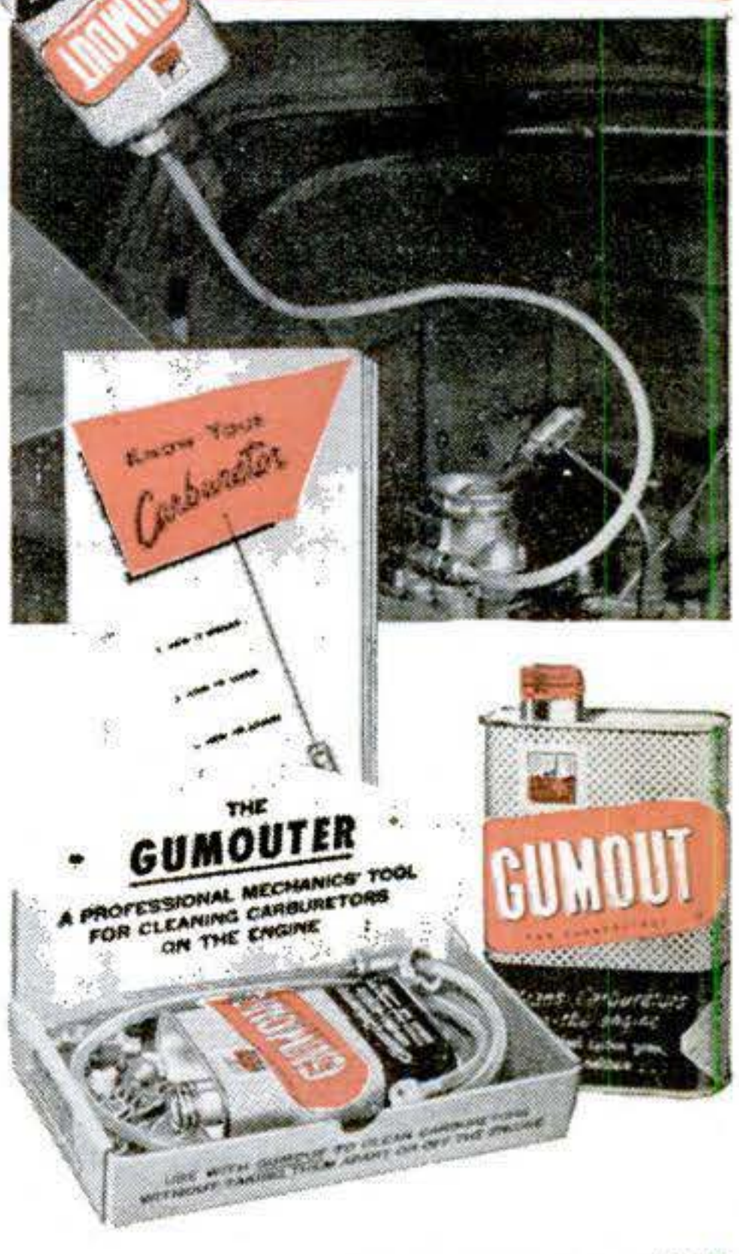
MILLERS FALLS COMPANY
Greenfield, Mass.

MILLERS FALLS TOOLS
SINCE 1868 ®

*The Mark of Superiority*

# How A Clean Carburetor Aids Quick Starting In Cold Weather

***An old problem now licked by cleaning carburetor right on the engine***




Engine experts blame many mysterious cold-weather starting troubles on the tiny speck of dirt or film that cuts carburetor efficiency.

If your car is hard to start in cold weather—even though the starter spins the engine fast enough and spark plugs and points are right—you should suspect dirt in the carburetor.

Fortunately, the carburetor today can be cleaned of all dirt, muck, moisture, gum and varnish in less than 20 minutes without removing the carburetor from the engine. You merely disconnect the fuel line; use an inexpensive "applicator" to feed GUMOUT—a special cleaner—into the carburetor; then reconnect the fuel line.

"Clean the carburetor *first*" is the sensible approach to curing not only cold-weather starting problems but any case of poor engine performance. Frequently, this quick, inexpensive job will save much of the time and money often wasted in checking timing, adjusting spark plugs, replacing points—even making major repairs—in an effort to correct trouble actually caused by a dirty carburetor.

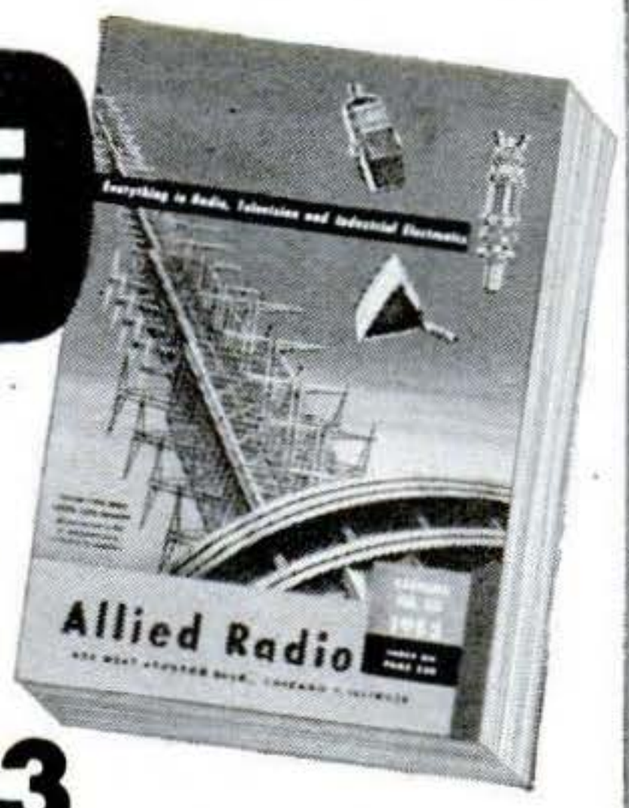
Pennsylvania Refining Company, 2689 Lisbon Road, Cleveland 4, Ohio has prepared a helpful *Carburetor Handbook,* which you can get free by writing the company. This firm markets the new carburetor cleaner under the name of GUMOUT. It sells for $1.50 a pint at most dealers. The applicator, called the GUMOUTER, sells for $4.75.




Copyrighted material

GET THE WORLD'S LEADING

# TV & RADIO CATALOG




**FREE**

236 VALUE-PACKED PAGES

**1953 ALLIED BUYING GUIDE**

*Save on Everything in TV & Radio!*

***Everything for Experimenters, Builders, Amateurs, Servicemen, Engineers and Soundmen***

Get the big 236-page 1953 ALLIED Catalog featuring the world's largest selections of latest top-quality electronic equipment at lowest, money-saving prices. See the newest in TV, home radios, Amateur Equipment, Hi-Fidelity sound, P.A. systems, recorders, test instruments, builders' kits—plus thousands of parts, tubes, tools and books. Get more for your money from the World's Largest Radio Supply House. Send today for your FREE 1953 ALLIED Catalog!

FREE CATALOG — SEND FOR IT TODAY

**ALLIED RADIO**

ALLIED RADIO CORP., Dept. 7-MM-2
833 W. Jackson Blvd., Chicago 7, Illinois

☐ Rush FREE 1953 ALLIED 236-Page Catalog

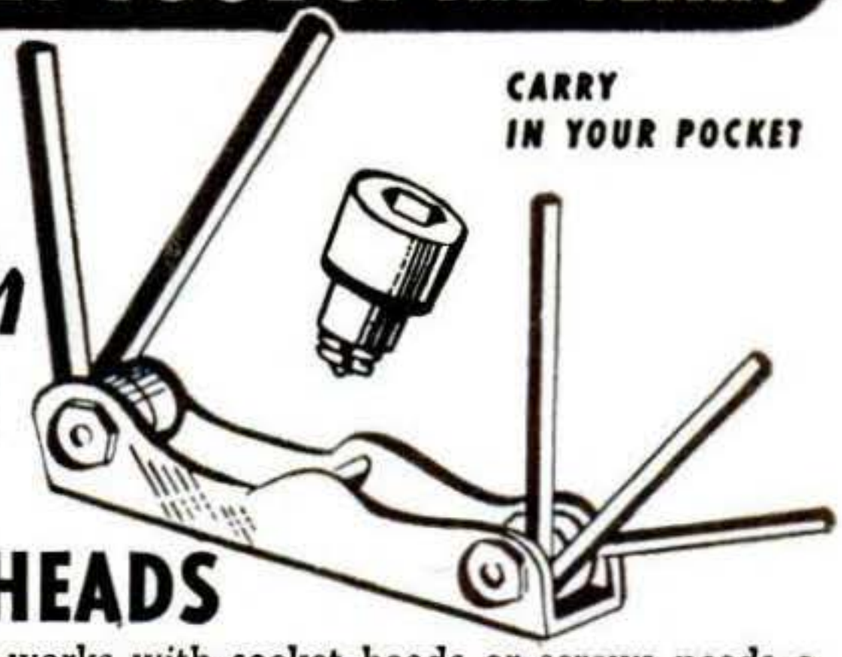
*Name*_____

*Address*_____

*City*_____ *Zone*_____ *State*_____



**POCKET TOOL OF THE YEAR!**



CARRY IN YOUR POCKET

# Smitty DRIVER FOR ALLEN HEADS

Everyone who works with socket heads or screws needs a Smitty. "Wouldn't sell mine for $5.00 if I couldn't get another"—say thousands of daily users. Fits all standard Allen type or socket-type bolts and screws. Handle gives great leverage. Equal to a whole kit of socket head wrenches. 5 sizes of shafts, each swing out like a knifeblade. Fits set-screws #10 to 7/16" inclusive, cap screws #5 to 5/16" inclusive. SATISFACTION OR REFUND. SEND TODAY.

SMITTY JR.—Sizes .050"—5/32" inclusive. $1.44 ppd. **$1.50 POSTPAID**

DEALER INQUIRIES INVITED

**HUNTER TOOLS**
BOX 7395 LUGO STATION • Los Angeles 23, California



# FOAM RUBBER (SHREDDED) PILLOW

Full size bed pillow 17"x27"x6"—regularly priced at $4.45, now only $3.39 post paid. Fine striped ticking filled with foam rubber—shredded to increase softness. 100% Sanitary, Non-allergy. Helps Asthma sufferers. Never packs. A wonderful bargain. Send check or Money Order.

**SPECIAL CUT SHAPES - FOAM RUBBER**

**Any shape, any size, for upholstery - furniture cushions - Lowest prices!**

| UNCOVERED FOAM PADS 1½" THICK | | AUTO SEAT PADS | |
|---|---|---|---|
| 12" x 14" | $1.00 | 24" x 60" x 1½" | $6.45 |
| 16" x 16" | 1.30 | 24" x 60" x 2 " | 7.95 |
| 16" x 22" | 1.75 | **MATTRESS PADS** | |
| 18" x 24" | 2.00 | Twin size ea | $19.55 |
| 22" x 24" | 2.95 | Full size ea | 23.95 |

**Special—4 Pads - 15"x15"x1"—$3.90**

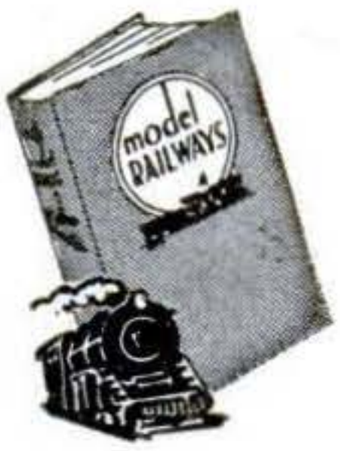
**No C.O.D's please! Add 10% for postage & pkg.**

Satisfaction Guaranteed—Ask for catalog No. 353

**RIOR RUBBER CO.** Dept. 353, 50 E. Cermak Rd. Chicago 16, Ill.



# New Thrills for Model Railroaders!




Hundreds of new ideas that will save you money and make model railroading more fun than ever! Shows how to lay your own track, how to make automatic signal systems, culverts, roundhouses, tunnels, switches and other modern railroad equipment.

It's easy to follow the clear, simple instructions and diagrams in this new book. Shows how to make freight cars, baggage cars, pullmans and day coaches. In addition, there are complete instructions and blueprints for building a Pennsylvania R. R. type locomotive.

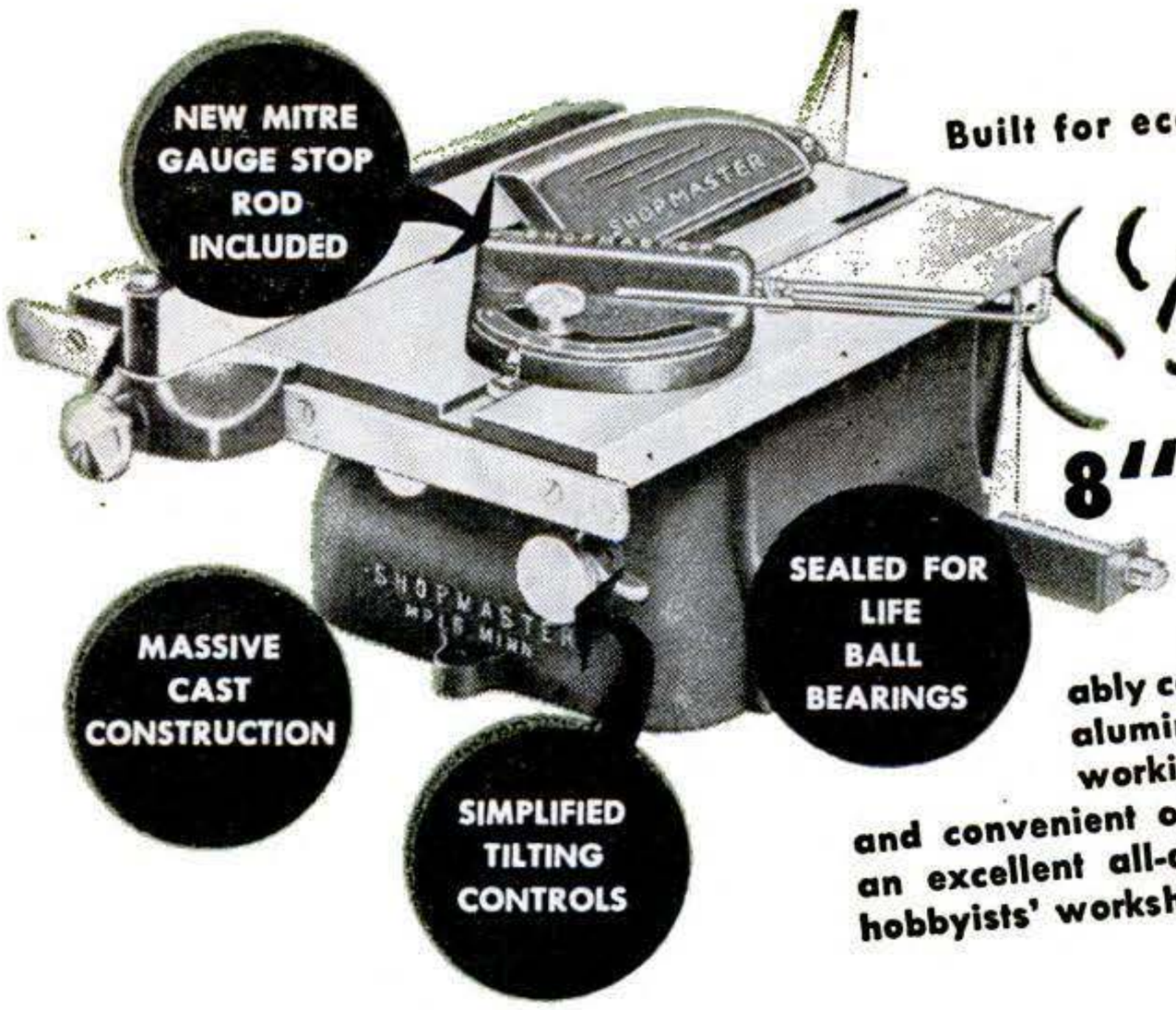
SEND NO MONEY NOW

Just write for your copy of MODEL RAILWAYS today, and pay the postman only $2.49 plus a few cents postage on delivery. If you prefer to remit now we pay postage. Money back if not satisfied. Address—

**POPULAR SCIENCE MONTHLY—Dept. 1252**
**353 Fourth Avenue • New York 10, N. Y.**




Copyrighted material




Built for economy-minded hobbyists who demand . . . QUALITY PLUS!

# Shopmaster 8" TILTING ARBOR SAW

A new Shopmaster tool at a new low price. Durably constructed of rugged cast aluminum alloy with large table working surface. Has visible and convenient operating mechanism. It's an excellent all-around tool for the new hobbyists' workshop.

Slightly lower Zone 1

Complete catalog of the famous quality Shopmaster tools.

## Other famous TOOLS

- 20" TILTING TABLE JIG SAW
- TABLE SIZE SPINDLE SHAPER
- 20" TABLE SIZE • SABER SAW
- 12" DRILL PRESS
- BELT AND DISC SANDER
- 10" SWING WOOD TURNING LATHE
- 12" TILTING TABLE BAND SAW
- 10" TILTING ARBOR SAW

SANTA SAYS:

## "A WONDERFUL HOBBY WORKSHOP GIFT!"

## NOW 40 DIFFERENT CUTS ON YOUR SAW WITH Warren DADO SAWING WASHERS

Cut clean, accurate, parallel grooves—40 widths, any angle. No chatter, burning, chewing—or sanding. Eliminates vibration—strengthens blade. No screws to fuss with. Simply dial width with Micromatic adjustment. Leave on blade for straight cuts. Sizes to fit your arbor—½", ⅝", ¾", 1". A perfect gift for woodworkers. See your dealer or write.

*Send for Free Booklet*

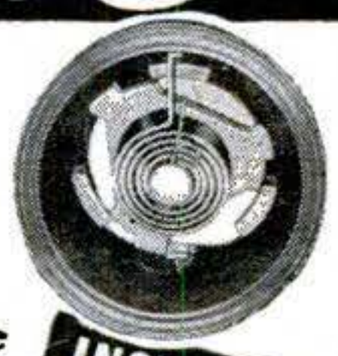
ONLY $4.95 PER SET

**WARREN WASHERS CO.**

BOX 98 • DEPT. 52 NORTH END STATION • DETROIT • MICH.

# CAR HARD TO START?

Get EASY STARTING . . . Smoother Engine Performance . . . Save Gas! with SENSATIONAL NEW SISSON Electrimatic CHOKE



Positive, dependable *electric choking* gives *quick, easy starts* every time in any weather. Smoother warm-up . . . no stalling ...no flooding...no seasonal adjustment! Fits any car equipped for automatic choking. $5 complete.

INSTALL IT YOURSELF Get FREE Illustrated Folder

Sisson Choke, 1654 Ohio Avenue
Anderson, Indiana

- ☐ Please send me FREE illustrated Electrimatic folder
- ☐ I enclose $5 (check or money order) for one Choke
- ☐ Ship C. O. D.—I will pay postage

Car Make_____ Year_____ Cyl._____

Carburetor Make_____

*Name*_____

*Address*_____

*City*_____ *Zone*____ *State*_____



Copyrighted material

# Gift...for a MAN

For the man who likes tools — 3 fine UTICA Adjustable Wrenches in the popular 6", 8" and 10" sizes.

Attractively boxed in festive Christmas wrapping — for brother, dad, hubby, son, Uncle Pete and any home workshopper or handy man.

Top quality—drop forged—extra-hardened on jaw surfaces for 10 times longer wear.

At your tool dealer's.

UTICA®

DROP FORGE AND TOOL CORPORATION

UTICA 4 NEW YORK

**IT PAYS TO BUY QUALITY TOOLS**

***and the world's best tools are made in U.S.A.***

---

# WONDER-PASTE

**Paint Remover**

The modern easy way to strip paint varnish enamel. Lacquer at all paint and hardware store.

***Write us for leaflet on Wonder-Paste***

**Wilson-Imperial Co., 121 Chestnut Street, Newark 5, N. J.**

---

# DRESS YOUR DULL GRINDING WHEELS

At last you can save time and money by reconditioning your dull grinding wheels. Apply this Genuine Industrial Diamond Dressing Tool to your dull grinding wheel for a few minutes and you'll get faster cutting results and better work. Made by the company that specializes in supplying diamond cutting tools to industry. LIMITED SUPPLY. ORDER NOW.

11¼" long with diamond set in tip.

**MONEY BACK GUARANTEE**

**GENUINE DIAMOND DRESSING TOOL**

**3.00** Post Paid in U.S.A.

**Industrial Diamond Company**
**2392 Wolcott Ave., Ferndale 20, Mich.**
**Enclosed is $3.00 for ☐ Industrial Diamond Dressing Tool.**

NAME.....

ADDRESS.....

---

# LESTO *Electric* HAND SAW

**WITH PLANETARY GEAR**

**NO OTHER DOES**

**SO MUCH**

**SO FAST**

**SO WELL**

Designed, Manufactured and Patented by Scintilla, Ltd., Switzerland since 1944.

At Last — a rip, scroll, band, jig, crosscut, coping, and keyhole saw — all in one. Quick, easy, ideal for curves and fanciest shapes. Cuts inside holes without drilling starting hole. Users say there's nothing to equal it on wood, sheet metal, bone, plastics, hard rubber, cement sheets, pressed wood, etc. For factory, home workshop, carpenters, decorators, etc.

**FREE** Illustrated Literature. Write for Yours Today.

Sold & Serviced in Principal Cities Throughout U.S.A.

**VICTOR J. KRIEG, Inc.**

Sole U.S. Representative for Scintilla, Ltd. Switzerland
51 West 52nd St., New York 19, N. Y.

---

# IDEAL LAWNMOWER SHARPENER

**MAKE EXTRA CASH THIS EASY WAY!**

Plenty of mowers to grind in your community! IDEAL Model 300 grinds them all with ease and precision—assures your reputation for perfect workmanship. Sharpens all mowers—hand or power—without disassembling. Exclusive hook grinding method perfected by 50 years' experience. Get started now in this profitable business; write for FREE complete catalog today.

**THE FATE-ROOT-HEATH COMPANY**
**Dept. PS-12, Plymouth, Ohio**

---

# 64" FLEXIBLE SHAFT

**WOVEN WIRE CORE** **USE AS ELECTRIC DRILL**

only **$5.95**

REAL BARGAIN — cannot be duplicated for $15.00. Coupling fits ½" motor shaft; other end fits standard chuck. Durable, heavy. Use it for grinding, polishing, buffing, drilling, etc. Chuck for same only $1.25. Send check or money order and we will ship P.P. prepaid. Money refunded if not satisfied.

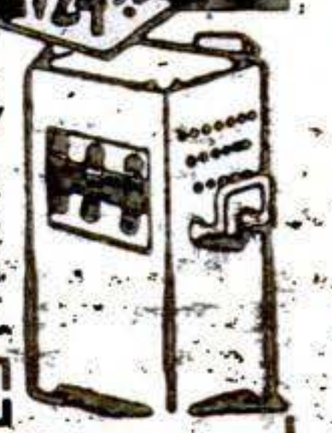
**HARRY W. RETTEW** 400 West Avenue Jenkintown 6, Pa.

---

# ARC WELDING

**FOR PROFIT OR PLEASURE**

**60 LBS OF READY MADE PARTS** Only 24.95



**BUILD YOUR OWN HEAVY DUTY WELDER** SAVE BUY ONLY NECESSARY PARTS

All necessary parts Ready-Made and easy to assemble. You can do all around welding on steel, cast iron and other metals after only a few hours practice. Illustrated instruction manual included. Sold on 30 Day Money-Back Guarantee! Free plans for building case.

**FREE:** Write today for fully illustrated Pamphlet S-12

**ATOMIC ARC WELDER CO.** 1039 So. 13th St., Omaha, Nebr.

*Gives 100% penetration. Welds are stronger than original metal.*



Copyrighted material

# "WAS MY FACE RED"

**. . . when I learned what a sucker I'd been for the oil change racket!**

**ARE YOU A VICTIM OF THIS SHAMEFUL HOAX?**

That's what they all say when they learn the truth. Car owners like you, MILLIONS of them - all in the same boat and sinking hundreds of millions of dollars in UNNECESSARY OIL CHANGES every thousand miles or so. Well, you ask, "What's wrong with that? Doesn't everybody know you've got to change oil every 1000 miles because it gets dirty and full of sludge?" We ask, "Who told you THAT?" Shall we tell you?

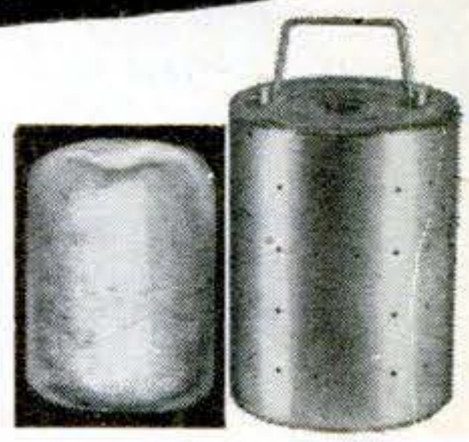
the OIL COMPANIES—that's who! We say they're wrong, dead wrong! They won't admit it but they know it too. And they're not the only ones. The U.S. Air Force knows it. Leading Airlines know it. Taxi companies know it. Truck operators know it. Greyhound Bus Lines know it. We say **it's about time YOU know it. How about it? Want to know the truth? It might embarrass you a little. It'll certainly make your face red with indignation. But, it will also show you how you can save hundreds of dollars now thrown away on oil changes and engine repairs due to faulty lubrication.**

**All it will cost you is 3 cents to get the answers**

No obligation. Nothing to buy. Just mail the coupon! It's as simple as that. Of course, if you are in a hurry, if you want to avoid that next oil change, send $9.95 now for the new invention that eliminates costly oil changes, and reduces engine wear. We'll send you LIFE-KLEEN—the PERMANENT Oil Filter Cartridge—plus TWO MIZER-X refills (Regular $14.95 value)—on a 30 day MONEY BACK GUARANTEE. Don't confuse LIFE-KLEEN with any other type of oil filter cartridge on the market. LIFE-KLEEN is *different* . . . and BETTER! PROVED better by thousands of taxi, truck and fleet operators in millions of miles of actual performance. And by private car owners, one of which already reports going more than 40,000 miles without changing oil.

**L-K FILTERS, INC.**
Dept. P-12
26 North Fifth Street, Allentown, Pa.

$14.95 VALUE
**$9.95**



**RIGHT COMBINATION**
for Performance PLUS Economy LIFE-KLEEN - the permanent oil filter cartridge - and MIZER-X Refill. Remember - with this unit in your car - you change ONLY the REFILL . . . NOT the OIL!

**L-K FILTERS, INC.**
26 N. 5th St., Dept. P 12 Allentown, Pa.

☐ I don't want your filter cartridge yet, but PLEASE SEND ME—FREE—"Facts About The 'Oil Change' Racket"—and complete information on how I can SAVE on oil bills and costly engine repairs.

Since I am taking no chance—thanks to your MONEY BACK GUARANTEE—send me one LIFE-KLEEN Permanent Oil Filter Cartridge—plus TWO MIZER-X REFILLS (Reg. Value, $14.95) for only $9.95. If not satisfied I will return unused within 30 days and you will pay the postage. ☐ Send information on dealer franchise.

☐ Send C.O.D., I'll pay postage charges. ☐ Enclosed is $9.95 for postpaid delivery.

NAME _____
ADDRESS _____
CITY _____ ZONE _____ STATE _____
MAKE & YEAR OF MY CAR _____

---

# x-acto®

**HOBBY KNIVES and TOOLS**

SEND 15¢ TO COVER POSTAGE FOR NEW ILLUSTRATED 28-pg. CATALOG
X-ACTO CRESCENT PRODUCTS CO. INC., 440 FOURTH AVE., N. Y. 16, N. Y.

---

# AUTOMATIC COMPRESSOR UNIT

***WITH 22 GALLON TANK***

½ H.P. heavy duty capacitor motor. 110 volt A.C., 2" bore, 1¾" stroke, 60 cycle, 2x1¾ inch piston type compressor. Splash feed lubrication. 14"x32" tank, automatic pressure switch, CFM 2.8 at 100 lb. pressure, or 150 lbs. pressure for intermittent duty. Check valve, safety valve, 20 ft. air hose with air chuck for inflating tires. V-belt drive. Mounted on 2 wheels, ball bearing, with 2"x8" semi-pneumatic tires. Portable with handle. Shipping wt. 150 lbs.

With ½ h.p. motor Regular Price $175 **$98.50**

With 1½ h.p. gas engine **$124.50**

Regulator, gauge and filter included at no extra cost.

**PRICES OF COMPRESSORS ONLY**

2 x 1¾—requires ¼ or ½ h.p. motor, 2.8 c.f.m., wt. 16 lbs. ..... **$20.50**
2½ x 2—requires ¼ or ¾ h.p. motor, 4.8 c.f.m., wt. 24 lbs. ..... **$27.95**
2½ x 2 duplex—requires 1 or 1½ h.p. motor, 3.10 to 8.5 c.f.m., wt. 45 lbs. ..... **$54.50**

**BARGAINS IN LIGHT PLANTS, BLOWERS, GENERATORS and GAS ENGINES**

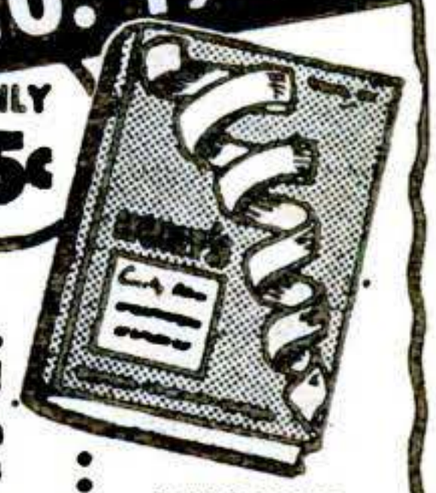
CATALOG FREE—WRITE TODAY

**WELLWORTH TRADING CO.**
1832 S. Wabash Ave., Dept. B-1282 Chicago 16, Ill.

---

# Send for this BIG NEW Hunt's WOODWORKERS CATALOG NO. 19

ONLY 15¢



***NEW LOW PRICES***

**Offers greatest selection of fine domestic and imported woods--and hundreds of woodworkers items at bargain prices!**

You'll save time and money with this big, new catalog. Contains everything wood craftsman needs. Shows 32 rare and fancy woods in color...43 veneer designs...275 scroll patterns...multicolor inlays, overlays, bandings...all kinds of tools, machinery, cabinet hardware, ornaments, mouldings...and pages of valuable tips, ideas, information, instruction. Send for your copy NOW. Only 15¢-refundable on your first order.

**144 PAGES QUICK DELIVERY** on maple, poplar, oak, mahogany, red cedar, cherry, walnut, and many others—all properly seasoned and kiln dried.

MAIL THIS COUPON TODAY

**CRAFTSMAN WOOD SERVICE CO.**
2729 S. Mary St., Dept. B12
Chicago 8, Illinois

Send me the big, new, money-saving Catalog No. 19. Enclosed is 15c--refundable on my first order.

Name _____
Address _____
City _____ Zone _____ State _____

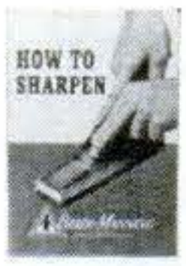



Copyrighted material

**JB-8**

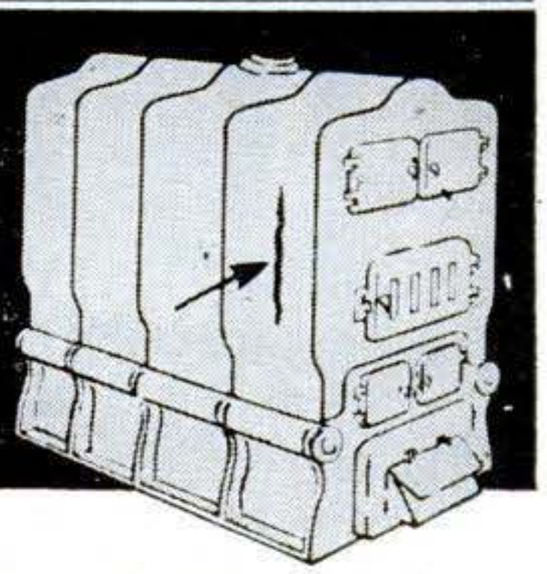
A fast-cutting, keen-sharpening CRYSTOLON® oilstone makes a welcome and necessary addition to any home workshop. Coarse grit on one side for quick sharpening. Fine side for super-keen edges on all edge tools. Pre-saturated with oil for free-cutting, long life — an exclusive feature of NORTON Abrasives oilstones. $2.45 at better hardware stores everywhere, or direct.

Add the "HOW TO SHARPEN" book to your gift — 32 illustrated pages give full directions for all sharpening jobs Send 10c to Behr-Manning, Troy, N. Y., Dept. PS-12.




**BEHR-MANNING** CORPORATION
division of NORTON Company
Coated Abrasives · Sharpening Stones · Masking Tapes

# STOP FURNACE LEAKS



Cut this winter's fuel bills. Seal *tight* every heat-wasting crack, opened seam and other leak in your furnace, boiler, tank, radiators and piping — as professional repair men do — with Smooth-On No. 1 Iron Cement. Keep a can of Smooth-On handy for tightening loose parts and many other repairs around your home. Buy Smooth-On No. 1 in 1¾-oz., 7-oz., 1-lb. or larger sizes at your hardware store. If they haven't it, write us.

## FREE *Repair Handbook*

40 pages of ingenious, tested, short-cut repairs. Simple directions. 170 illustrations. Write today for YOUR free copy of the Smooth-On Handbook. SO 379

**SMOOTH-ON MFG. CO., Dept.58M**
**570 Communipaw Ave., Jersey City 4, N. J.**

*Do it with*
# SMOOTH-ON
THE IRON REPAIR CEMENT OF MANY USES

# Build Your Own Drill Press

**vises, clamps, hand tools . . .**

Yes, you can have the satisfaction of saying "I made it myself"—and save money, too! I now offer these tested plans to workshop hobbyists after successful applications in over 2500 industrial arts and vocational schools in 47 states! Plans are fully dimensioned and properly engineered to produce high-grade machine and hand tools with a minimum of power equipment! *Simply send 50¢ in stamps or coin for big 36-page book* of 30 working drawings on a variety of home workshop equipment that you can build yourself. This book also lists high-quality castings and other basic parts which we can supply for these projects at attractive prices. Money back guarantee. For both the beginner and experienced man. Write: Clarence Struck, *Gen. Mgr.*,

**CASTING SPECIALTIES, 1925F N. 49, Milwaukee 8, Wis.**

**SMALL! POWERFUL!**

America's finest low cost tractor. Ruggedly built. Easy to operate. No belts, no chains. Borg-Warner clutch, trans. and diff. 140 to 1 reduction. 40% more drawbar pull than ordinary tractors. 8-1/4 H.P. engine--gasoline or kerosene. 20 quick change implements. Write for complete details.

**ENGINEERING PRODUCTS CO.**
915-A12 NIAGARA CT., WAUKESHA, WIS.

# ONE-MAN SAWMILL LOW AS . . . $50.00 DOWN

FREE BOOK

Take BELSAW Portable Sawmill right to the trees—turn out valuable lumber for local yards—do "custom sawing" for neighbors. BELSAW lasts a lifetime. No crew needed. Power with old auto engine. Beginners get excellent results. Send postcard for FREE BOOK, "How To Make Lumber."

**BELSAW MACHINERY CO**
**8464 Field Bldg. Kansas City 11, Mo.**

# TRANSFORMER WELDER $18.95 FOB QUINCY

Complete with everything. Ready to plug in. 110 volts A.C., 15-30 amps. 3 heats. Welds metal from 1/16" to ¼" using 1/16" to 3/32" standard rods. Guaranteed unconditionally. 10-day trial. No C.O.D. We also make welder for 16-22 gauge metal, $3.95; ⅛" metal $6.45.

**ESSAY MFG. CO., INC., Dept. 47, Quincy 69, Mass.**

**ONLY $65.00 FREIGHT PREPAID**

**WE SEND YOU A LATHE—NOT LITERATURE**
**To Prove by Trial the Biggest Lathe Value Ever Offered**

You've read about other lathes—seen attractive color photos, but you can't machine a thing with words or pamphlets. We won't send you literature but we will send you a brand new, top quality lathe, freight paid. We let you see our lathe—feel it—actually machine with it while you make up your mind to keep it or shove it back in the crate and return it freight collect. And what a lathe it is! Sturdily built with bed ways machined with double V to 60°. The compound swivels 360° on a center pilot and is locked with 2 T-slot bolts. Lathe may be operated with a ¼ h.p., 1750 r.p.m. motor. Bed length 26" with cutting range 18½", 6" swing. Sent complete with hand undercutter and lever hand feed, 2 female centers, 2 male centers, driving dog, arbor attachment and grinding wheel, V-belt, 2 power feed belts, tool bit, face plate and dog. The lathe is precision and sturdily built to handle every metal or wood job within its dimension cap. Ideal for factories, hobby and home workshops or as armature lathe for garages. Full price freight paid only **$65.00.** 10 day free home trial—you must be satisfied or return it at our expense for your money back in full. Immediate delivery while they last. Send check or money order for **$65.00** to:

**HAMILTON PRODUCTS, INC., 12416 Euclid Ave., Cleveland 6, Ohio**




Copyrighted material

GIGANTIC EXPANSION **MAIL SALE** WAR SURPLUS EXCESS INVENTORY BANKRUPT STOCK

## POWER PLANTS and GENERATORS

- **Master Plants,** 5KW, 115-230-v, 60-c, 4-cyl. engine, manual start. Cost over $1100.....**$531.70**
- **Onan Plants.** 5KW, 115-v, 60-c, 4-cyl., push button start. Cost $1400.00* .....**$689**
- **Onan Plants.** 1 KW, 115-v, 60-c, Full automatic start-stop .....**$291.50**
- **Burdex Plants,** 2KW, 115-v, 60-c.....**$297**
- **Homelite Plants,** 1.5KW, 115-v, 60-c **$199**
- **Kato Generators.** 5KW, 115-v, 60-c, with control panel, drive pulley, etc. 1800 RPM. 1 phase. Cost $550 .....**$259.50**
- **Generators.** 115-v, 60-c. Ball bearing. 500-w. **$94.50;** 1000-w, **$134.90;** 2000-w, **$159.50.**

*Write for Power Plant Catalog*

## HYDRAULIC BARGAINS

Build your own loaders, diggers, presses, plow lifts, etc. Lowest prices. Savings to 80%.

**Pump,** 1000 lbs., 12 g.p.m., 400 r.p.m. .....**$45.50**

**Cylinder,** 2⅜" bore, 19" stroke, 9000 lb. lift. List $91.50. .....**$18.49**

**Cylinder,** 2" bore, 10" stroke, 3141 lb. lift. Sale .....**$16.50**

**Control Valve,** For single or double acting cylinders. Sale .....**$17.98**

*Write for Hydraulic Data-Catalog.*

## Winches - Hoists - Blocks

- **Boat,** dock, business hand winch, 1-4 gear ratio. Special....**$19.95**
- **Farm-Truck-Contractor** heavy duty hand winch. Dual ratio 1-3, 1-9. Finest cast steel construction. Special .....**$29.98**
- **Chain Hoist.** Lever type. 3000 lb. ..... **$19.48**
- **Truck Crane-Winch.** Mounts on trucks and pick-ups. Special .....**$84.60**
- **Winch Cable.** ¼" super-flexible (4000 lbs. cap.) 50' with load hook.....**$9.90**
- **Army Snatch Block.** 13,000 lb. List $19.40 ..... **$12.95**
- **$165 Airplane Winch.** Beautifully made. Requires reducing gear. Sale.....**$17.49**

BURDEN PAYS ALL SHIPPING CHARGES

## SUPER CLOSEOUT BARGAINS

- **10-Piece Stainless Steel** top quality kitchen knife set, rosewood handles, $10.50 value. SALE .....**$5.49**
- **Genuine Mail $325 Chain Saws..$281.50**
- **Electric Chain Saws** .....**$98.90**
- **World's Finest ($225 Stainless Steel 7-Row Weed Spray Outfit**.....**$129.50**
- **Plane Propellers.** ($151.50) Beautiful polished hardwood. 7' 6" long. Snow sleds, ice boats, den decoration .....**$12.95**
- **Search Lamps.** G.E. Plane landing. Tremendous 4,800,000 c.p. output! 2-mile range. 24-volt (6 for **$7.49.**) 110-volt .....**$1.95**

## WATER PUMPS and SYSTEMS

Save up to 60%. Ask us for expert advice on your problem. Pumps for wells, basements, weed spraying, septic tanks, garden irrigation, etc.

- **Centrifugal Pumps.** Cast iron, stainless steel shaft, bronze impeller, ball bearings. No. 75, ¾". **$18.90;** No. 100, 1". **$28.90;** No 150, 1½", **$35.60.**
- **Bronze Rotary Pumps.** *Low pressure* (25 lbs. max.) Self priming. No. 12, ½", **$12.75;** No. 34, ¾", **$16.95;** No. 101, 1", **$22.95;** *Hi-Pressure type* (150 lbs. max.) No. 612, ½" **$14.50;** No. 634, ¾". **$20.95;** No. 610, 1", **$27.95.**
- **Irrigation War Surplus Pump.** 10,000 g.p.h. 2½" intake. Two 1¾" outlets, Special....**$39.50**
- **Burdex Shallow Well System.** 110-volt, 60-c, 300 g.p.h. 40 lbs. pressure, fully automatic. Easy to install.....**$69.50**
- **Adj. Auto Pressure Switch, $4.95;** ¾" foot valve, **$2.49;** pressure gauge 0-60 lbs. **$1.89;** also hose, strainers, etc. at real savings.
- **Hand Pump.** Lever type, high capacity, Pump basements, tanks on farms, etc. Cost $35, **$27.80**

*Write for useful Water Pump Data-Catalog*

## Miscellaneous Surplus Bargains

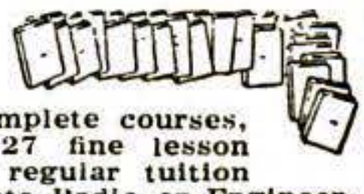
- **Inspection Magnifier Reading Glass $2.97**
- **German Pocket Microscope** (25 power) **$3.49**
- **Binoculars,** Best quality 7x50 coated **$47.50**
- **Immersion Heater,** 110-v, 750-w ....**$3.89**
- **Engineers Hand Level** .....**$5.84**
- **Navy Life Saver Inflatable Belts....$1.09**
- **Timber and Brush Eng. Driven Spray-Kill Outfit.** List $267.00.....SALE **$163.50**

## SPECIAL FOR THE MONTH

### NAVY WEATHER BUREAU THERMOMETER

- Finest precision direct reading instrument. Shows outside temperature on large 5" attractive easy-to-read indoor dial. Flexible 5' tube connects to outside brass enclosed sensitive element. Reads—40° to 120° F. Wonderful unit for factory, home, farm, etc. Original cost $49.50. SALE .....**$9.85**

## CORRESPONDENCE SCHOOL BARGAIN



- Famous engineering school closes because of high operating costs. We offer limited quantity of complete courses, Radio or Electrical (27 fine lesson texts) at fraction of regular tuition rate. Deal #1, Complete Radio or Engineering Course Texts, **$5.95.** Deal #2, Combined Radio and Electrical Course Texts, **$9.95**

## AIR COMPRESSOR UNITS

Paint, blow up tires, control termites, clean greasy engines, blow dust, etc. Build your own or buy ready-built units.

- **DeLuxe Air Kit.** Consists stainless tank 12"x24", finest 1-cyl. 3 cfm piston compressor, valves, gauge, fittings, hose, excellent paint gun, blow gun, pressure regulator, chuck and "How To Build Portable Outfit." Special .....**$45.49**
- **Economy Air Kit.** Same as above except 6"x24" tank and no regulator or paint gun. Each.....**$31.90**
- **Air Components.** Top quality. 1-cyl. piston comp. **$20.50;** 2-cyl. pis. comp. **$49.50;** Adj. Auto. pressure switch, **$4.95;** pressure regulator, **$2.65;** Adj. safety valve, **$1.95;** Pressure gauges, 0-160 lbs. **$1.89.**
- **Air Operated Power Grease Gun...$23.95**

*Write for interesting Air Data-Catalog*

**ORDER FROM AD, or Write for 4 FREE Catalogs!**

**OUR 30-YEAR POLICY:** • Everything Guaranteed Satisfactory • We Pay Shipping Charges in U.S.

FREE CATALOG

**BURDEN SALES COMPANY**

834 "O" ST. LINCOLN, NEBRASKA

---

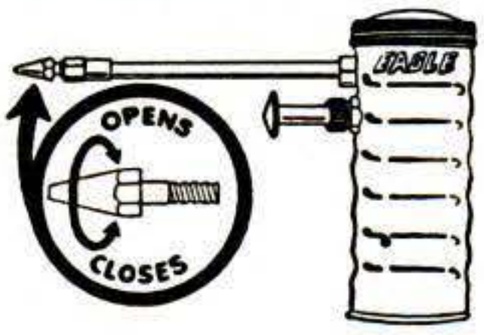
# PRACTICAL GIFT FOR THE HOBBYIST and HOME FIXER

## EAGLE

### "66" BRASS OILER

**WITH NEW SHUT-OFF SPOUT TIP!**

**Prevents dripping, leakage!**




**A necessity for every work bench! Deluxe, modern design, pistol grip all-brass Eagle Pump Oiler—delivers one drop or a full stream. Easy finger control operation. SPARK-PROOF.**

**Buy one at your dealer's, or if he does not have it, write to:**

**EAGLE MFG. CO.**
**Wellsburg, West Virginia**

---

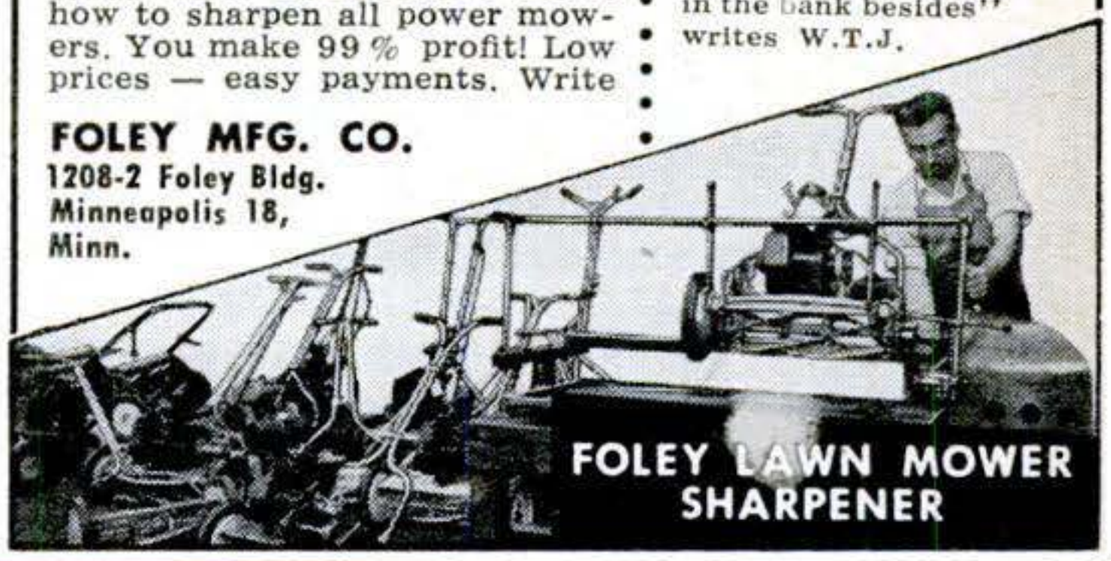
# *Made $2,600* Last Season

**FREE PLAN** tells how to start in spare time. FREE BOOK shows how to sharpen all power mowers. You make 99% profit! Low prices — easy payments. Write

**FOLEY MFG. CO.**
1208-2 Foley Bldg.
Minneapolis 18,
Minn.

"Last year we sharpened and repaired about 1000 lawn mowers for a net profit of $2,600," says E. G.

"I have made a good living and have put money in the bank besides" writes W.T.J.



FOLEY LAWN MOWER SHARPENER

---

# CUT-TO-FIT HOMES CUT BUILDING COSTS

CHOICE OF 57 DESIGNS

***ORDER NOW***

***SAVE UP TO 1/3***

Build your own home and save the builders' profit—plus savings in lumber and labor with Sterling Ready-Cut-Homes. Anyone can assemble with simple, easy to follow plans furnished. Every house complete with all lumber, roofing, nails, glass, hardware, paint, doors and windows marked ready to erect. Freight paid. Complete building plans ready for filing at low cost. Sold separately if desired. Write today!

**PRICED FROM $2150 UP**

**Five Easy Payment Plans**

**Send 25c for *NEW* COLOR CATALOG**

**INTERNATIONAL MILL AND TIMBER CO.**
**DEPT. P.S. 122 BAY CITY, MICHIGAN**



Copyrighted material

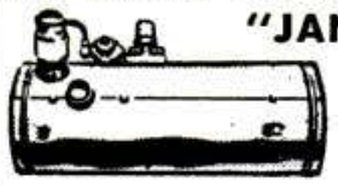
# BUY from C&H you'll save and be sure

HUNDREDS of SENSATIONAL BARGAINS!

**BOOSTER FANS** fit any 8", 9" 10" furnace pipe. 1500 rpm motor with 6' cord, mounting frame, 6" blade. Motor 110 v. 60 cycle 1550 rpm. Easy to install. Silent operation. Warm those rooms with long runs. List $11.95. Our price **$6.95**

**High Volume BLOWERS**

75 C.F.M. **$10.95**
150 C.F.M. **$13.95**
300 C.F.M. **$17.95**
500 C.F.M. **$36.00**
Top performance for forced draft, ventilating, exhausting, cooling, drying. 110v. AC.



**"JANITROL" AIRCRAFT HEATERS**

Warms up fast- just the thing for heating trucks, buses, garages, etc. Has an output of 50,000 BTU's per hr., 24 volts DC. Length 23", diameter 13", weight 14 lbs. Original cost $130. Our price, NEW . . . . . **$19.95**

## LIGHT PLANTS

**300 Watt** 110-220 volt AC Wgt. 40 lbs.—portable **$99.**
**750-1000 Watt** 110v. AC Briggs & Stra'n. eng. **$169.**
**1000-1200 Watt** 110v. AC only . . . . . **$194.00**
**2500-3000 Watt** 110v. AC Slow speed (1800 rpm) Leland generator for longer life. Recond'nd and fully guaranteed **$295.** NEW **$345.** Plants built in 1951 with tools & spare parts, **$426.** 5 KW Plant 120 v. 60 cycle AC. Lists at $1800. Our price $795. Extra parts & tools $25. 2 reels of cable & switch $115. Plant, cable & parts complete **$895.**

**54 to 1 BOSTON Speed Reducer**

Reduces speed of ordinary 1750 rpm electric motor to 33 rpm. Lists at $55.00. Our price . . . . . **$29.50**

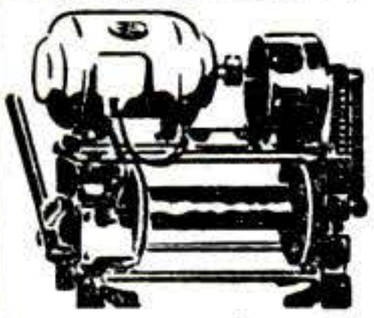
**80-1 ratio Gear Reducer**

Double reduction, reduces 1/6 to 1/2 HP electric motor's 1750 rpm to 22 rpm. Reg. $45.00. NOW . . . **$22.00**

**RUBBER HOSE**

Long wearing GOODRICH 2 ply 2" I. D. 25 ft. lengths worth $25. Only **$4.95.** 3 lengths for **$12.00**

## SENSATIONAL POWER & HAND WINCH VALUES



**For—BOATS, TRUCKS, FARMERS, LOGGERS, CONTRACTORS, ETC.**

**Hand Winch,** 3-1 ratio, 600 lb. pull, drum has 1 5/8" spool, 6" flange, takes 75' of 3/16" cable, stop locking pawl, wgt. 26 lbs. . . . . **$16.95**
**Ball bearing Hand winch,** low ratio 1-1, high ratio 3-1, 600 lb. pull . . . . . **$29.50**
**Same as above** with bronze worm gear, 12-1 ratio and hand-brake . . . . . **$39.50**
**1/2 HP electric** ball bearing model; releasing brake starts motor, brake on-motor off; compact gear box, 12 rpm drum speed . . . . . **$135.00**
**3.4 HP,** same as above, 3" drum . . . . . **$165.00**
**Heavy duty,** 10-1 ratio, double drum model with jaw type clutch, wgt. 280 lbs. . . . . **$49.95**
**CABLE,** 1/4" preformed stainless steel aircraft, 100 ft. or less 17c/ft. Over 100 ft. . . . . **15c/ft.**

Hundreds of $$ saving buys. These are a few of the many items at sensationally low prices!

Pumps, Grinders, Drop Cords, Generators, Fire Pumps, Saws, Clutches, Air Tanks

**C&H ELECTRIC MACHINE Co. Inc.**
438M W. Juneau Ave., Milwaukee 3, Wisconsin

---

# Increase Compression As Much As 126% with Fisher's Compression SEAL

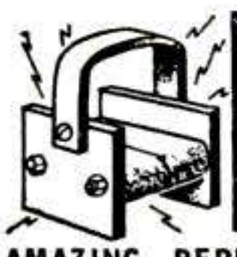
**$3.95 ppd.**

**• Stop Burning Oil & Check Piston Slap**

Amazing new discovery, Fisher's Compression SEAL, has been tested and approved by a leading independent laboratory. Guaranteed to increase your car's compression, reduce oil consumption and check piston slap **or your money back!** Easy to apply. Simply squeeze a small amount into each cylinder bore. This self-expanding compound then **seals** the excessive clearance between piston and cylinder wall, thus allowing you to enjoy former operating efficiency. Lasts 10,000 miles. $25,000 insurance policy assures you it cannot harm the finest engine. Only $3.95 postpaid. Acts while you drive, costly ring or rebore jobs may not be necessary. Free folder. Send cash, check or M.O. **Dealers,** a postcard will send our representative to your door.

**ADVANCED ENGINEERING** BOX 7013, DEPT. PS-12 LOS ANGELES 37, CALIF.

---



# MAGNETS 225 lb. PULL

GENUINE ALNICO—NEVER WEAKENS

**AMAZING, PERMANENT MAGNETS—WILL NOT WEAKEN! NON-ELECTRIC**

Retrieve guns, tackle, tools and other steel items from lake, river, plating tanks, drains or other hard-to-reach spots. Recover drills, taps, etc. from sweepings. Clear alley of harmful tacks, nails. Many other uses. Pays for itself quickly. GUARANTEED. Try any magnet one week. Money refunded if you are not well pleased.

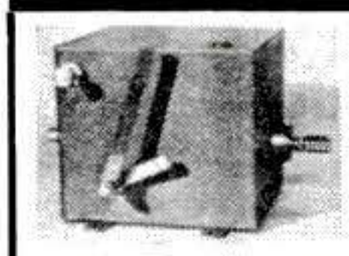
No. S-725 (Weighs 54 oz.) Has pull of 225 lbs. on steel block **$15.00**
No. S-675 (Weighs 49 oz.) Has pull of 175 lbs. on steel block **$10.50**
No. S-650 (Weighs 41 oz.) Has pull of 150 lbs. on steel block **$ 8.50**
No. S- 30 Hobbyist assortment of six small magnets . . . . . **$ 1.50**

Send Money Order or check. We pay postage. No C.O.D.'s

**MIAMI MAGNET COMPANY, 3240 N.W. 27th Ave., Miami 42, Fla.**

---

# VARIABLE SPEED HYDRAULIC POWER TRANSMISSION



It has Infinite Speeds 0 to 550 Reverse Automatic Overload Protection: Adjustable Torque up to 180 inch pounds. 5/8" Input and Output Shafts. It will handle 1/4 to 1 1/2 H.P. Motor. Case measures 7 1/2" long 7" high 6 1/2" wide. VALUE OVER $300. Shipping Wt. 25#. On C.O.D. Orders we require a 10% Deposit.

only **$54.50** Fob. Chicago

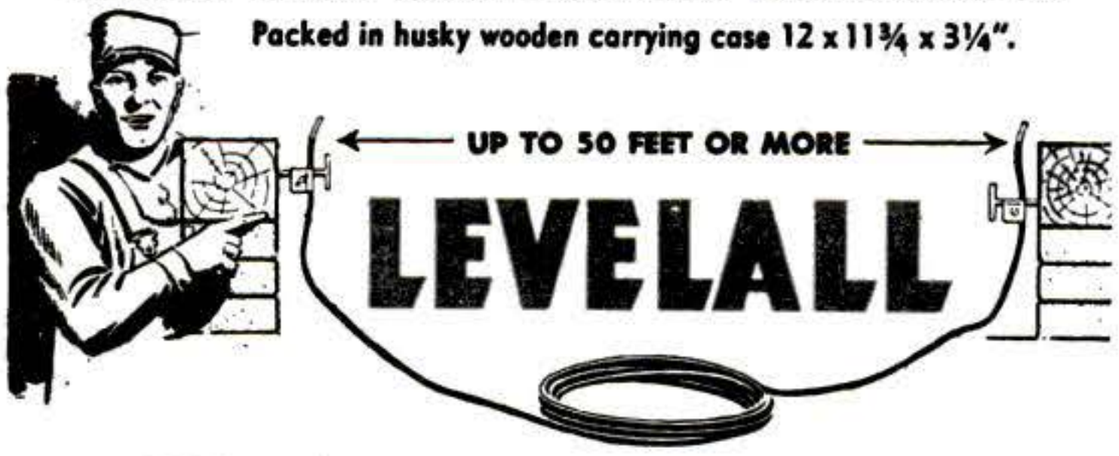
**DIRZIUS MACHINE SHOP "U" 1423-25 So. 52nd Ave., Cicero 50, Ill.**

---

---

**FASTER THAN $100 ENGINEER INSTRUMENTS!**

Packed in husky wooden carrying case 12 x 11 3/4 x 3 1/4".




**THE NEW, IMPROVED WATER LEVEL FOR SIMPLEST ONE-MAN OPERATION**

**FOOTINGS FOUNDATIONS GRADINGS**

Anything you need level LEVELALL does it

Regular 50 Feet **$7.45**

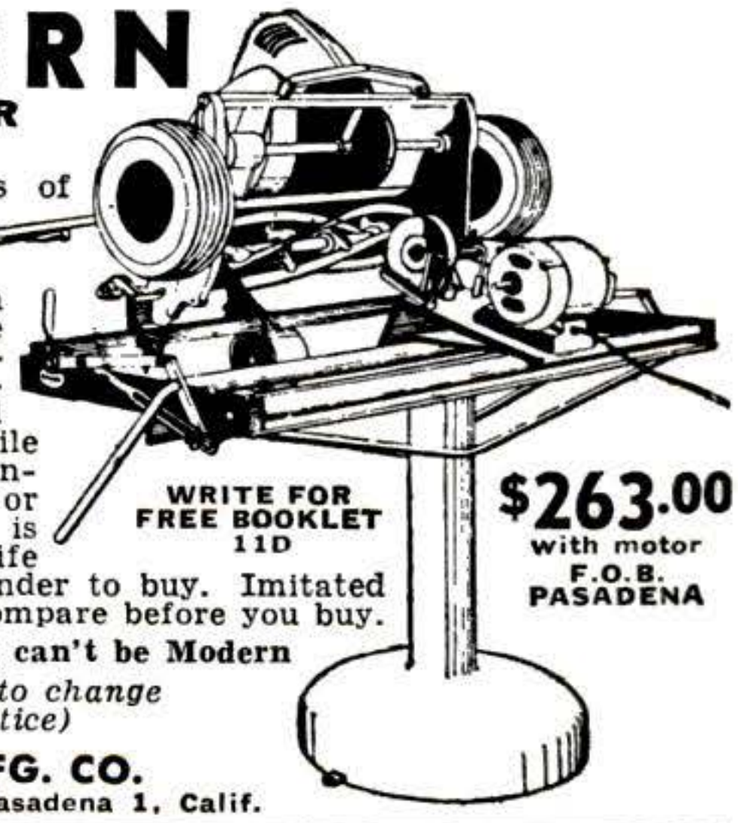
Deluxe 75 Feet **$12.45** Heavy Case

Inquire — your dealer or by mail Post Paid, send Check or M.O. Will ship C.O.D. you pay charges.

**LEVELALL • 81 WEBSTER ST. • ROCKLAND, MASS.**
DEALER INQUIRIES INVITED

---

# MODERN LAWN MOWER SHARPENER



Service departments of leading Lawn Mower manufacturers use the Modern Lawn Mower Sharpener. One lever moves lawn mower into grinding position. Gasoline and oil remain in engine while sharpening, no dismantling of wheels, roller or handle. The Modern is a precision bed knife grinder—no extra grinder to buy. Imitated but never equaled—Compare before you buy.

**If it isn't a Modern it can't be Modern**

*(Prices subject to change without notice)*

WRITE FOR FREE BOOKLET 11D

**$263.00** with motor F.O.B. PASADENA

**MODERN MFG. CO.**
160 N. Fair Oaks - Pasadena 1, Calif.

Copyrighted material

# 4 TOOLS IN 1

*The Complete*
**METAL WORK SHOP**
**FOR HOME AND PLANT**

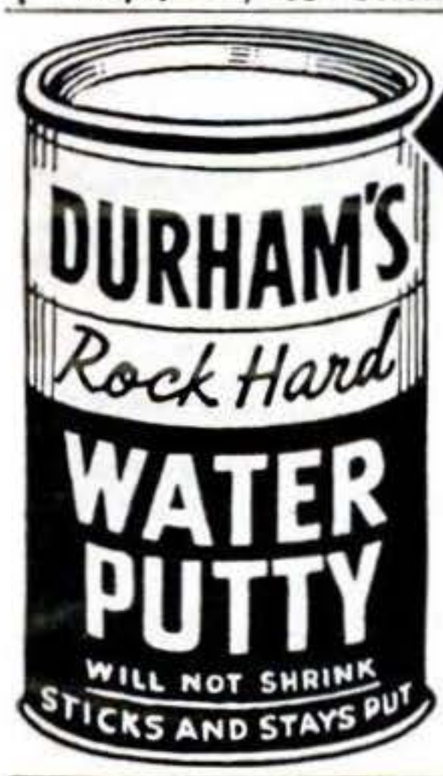
Patent No. 2053309

IT
FORMS
SHEARS
PUNCHES
RIVETS

**INTRODUCTORY PRICE**
Only
**$6.95**
**DELIVERED**

**BENCH TOOL that FORMS, SHEARS, PUNCHES, RIVETS—one small compact tool that is a complete metal workshop. Bending and forming dies make smooth sharp bends in either bar or rod stock. Hardened steel shearing jaws shears metals cleanly up to ¼" thickness. An efficient punch press complete with ⅛", 3/16" and ¼" punches. Rivets easily with punch press and rivet dies. Check must accompany order. No C.O.D.'s. Full immediate refund if not completely satisfied.**

**TATU CO.**
**Dept. G4, 85 Columbia Dr., Williamsville 21, N. Y.**




## The Modern PLASTIC for lasting Home Repairs

PERMANENTLY mends cracks or holes in wood, tile, stone or plaster. Sticks and stays put—Does not chip, shrink or fall out. Easy to use. Economical. Mold it, chisel it, polish or paint it. If unobtainable from your lumber, paint or hardware dealer, the big 4-lb. can will be sent you postpaid (in U.S.) for only $1.25. Full money-back guarantee, order now.

**DONALD DURHAM CO.**
Box 804-X, Des Moines, Iowa

# CASH IN YOUR SPARE TIME!

**BIG MONEY IN OWN BUSINESS**

YOU CAN MAKE UP TO $40 a DAY sharpening and setting circular saws for factories, builders, lumber yards—with NEW BELSAW COMPLETE CIRCULAR SAW SHOP. **Low Cost, only $15 down,** sharpens 4 to 5 saws an hour. *No experience needed!* Instructions Furnished. Send Postcard Today for FREE BOOK. ▶

LIFE-TIME SECURITY
YOUR OWN BUSINESS

**BELSAW MACHINERY CO. 4405 Field Bldg. Kansas City 11, Mo.**

MORE JOBS EASIER QUICKER

## With Gear-Driven "RED-E" GARDEN TRACTORS

**NO BELTS! NO CHAINS!**
***Proven For Over 29 Years***
**NEW 1953 MODELS**

Thousands of satisfied users say "RED-E" has solved their tractor problems. You too, will like its smooth, powerful, easy-to-operate, gear-driven action—with power turning clutch for 4½ and 6 H.P. WALKING MODELS and automotive type differential for 8½ H.P. RIDING MODEL. Our 2 and 3 H.P. Walking Models low as $169.00. Attachments for plowing, sowing, cultivating, wood-sawing, snow-plowing, etc. EASY TERMS—Factory-To-You discount. Write for FREE Catalog.

**RED-E TRACTOR CO. Richfield 329, Wisconsin**

# YOUR LIFE MAY DEPEND ON USING THE RIGHT BRAKE FLUID

Just keeping enough fluid in the brake system is NOT the answer if you want good brakes . . . and SAFETY!

There are many brake fluids which can be dangerous . . . some, freezing point too high or boiling point too low . . . no water absorption . . . no rust protection . . . no lubricating qualities . . . ingredients which cause distortion of rubber parts and formation of sticky gums . . . and . . . some that won't properly mix with fluid presently in brake system.

***Don't Take Chances . . . INSIST ON***

# BOWES SEAL FAST BRAKE FLUID

Certified to meet or exceed S A E Specifications

**IF YOU WANT TO STOP IN TIME...**
**SEE YOUR BOWES DEALER**
***FOR SAFE BRAKE FLUID!***

**BOWES "SEAL FAST" CORP., INDIANAPOLIS 7, IND.**




Copyrighted material

# INSTALLED IN JUST 30 MINUTES

## Nova Roller Doors for passageway or storage space

**Be modern** — with handsome, silent, **space-saving** roller doors. Exclusive Nova construction features give you doors operating under fingertip control — built for year 'round use in any climate — light, strong, warp-resistant. Two or more doors enclose any opening. Each door comes complete in one carton and is quickly installed by one man. . . . These are hollow core, flush doors — regularly sold in the finest plywood or lumber — from birch and gum to imported mahogany, for any waxed, stained or painted finish your interior design may demand. **Write today for fully illustrated literature.** Department 17C, NOVA SALES CO., Trenton 3, N. J.

# WOODS

## get this *BIG Catalog* without cost!

Loaded with how-to-do it articles on wood-finishing, veneering, making inlay pictures and cabinets. Contains 83 distinct inlay designs and borders, plus a wood identication panel of 60 different varieties. All shown in full natural color suitable for framing.

**A MULTITUDE OF MATERIALS**
*Lowest Prices On*

| | |
|---|---|
| Veneers | Period Furniture Hardware |
| Inlays | Modern Picture Frame Molding |
| Lumber | Upholstery |
| Plywood | Hand and Electric Tools |
| Plans | Finishing Materials |
| Supplies | Decorative Metals |
| Plastics | Leather |

Albert Constantine & Son, Inc.
Dept. PS-7 797 E. 135th St., N.Y. 54

● VISIT US at our N. Y. Plant. Demonstrations every Saturday on making inlaid pictures, wood finishing and other crafts. Everyone invited.

**SEND THIS COUPON!**

Albert Constantine & Son, Inc., Dept. PS-7
797 E. 135th St., New York 54, N.Y.
Enclosed find 50c (refunded on 1st order) for your copy of "Manual For Craftsmen" No. 52.
Name_____
Address_____
City_____ State_____

# PAGE Garden Tractors

## 1953 MODELS More Work! Less Cost!

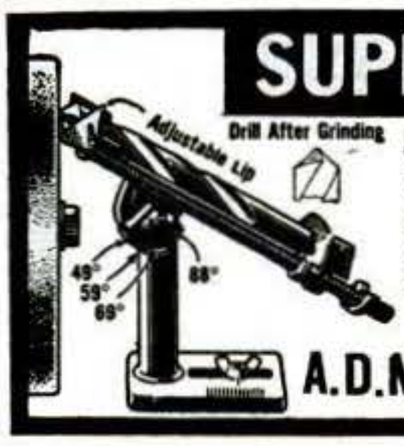
• 2 to 6 HP walking and riding machines • Over 60 attachments available! • Enclosed gear drive with reverse.
No belts — No chains!
Also new one-wheel "Bantam" model
Low Prices — Easy Terms
25 years' experience behind every PAGE — fully guaranteed!

Plows, discs, tills, seeds, cuts grass and weeds, and many other jobs!

Free Catalog Shows over 60 attachments!

**PAGE** 1816 S. 81st St. Milwaukee, Wis.

# SUPER DRILL GRINDER




Sharpens round shank drills from 3/32" to 1/2" in diameter, up to 6" long. Grinds old drills like new in 4 different point angles, using hand or power grinding wheels. Money-back guarantee, only **$2.95**

*At Dealers or Postpaid*

**A.D.McBURNEY** 317 E. 4th St., Dept. S-24 Los Angeles 13, California

# HOBBYISTS! SHOPMEN! *Special* ONLY $54.50

**PALMGREN "HOBB-E" Rotary, Index, Milling Table**
***Ideal for Model Parts or Shop Work***

Mill-Grind-Drill-Index-Rout curved or straight-Rabbet and Mortise on drill press or lathe. 8" Table, 4" Cross Feed, 360° Rotation, Accurately Graduated. Bolts to table. Order NOW! SAVE $100. Only **$54.50.** Less Rotary Feed **$39.75.** Write for "HOBB-E" Tool Circular.

CHICAGO TOOL and ENGINEERING CO.
8396 South Chicago Ave. Chicago 17, Ill.

# *NEW* Saw Sharpener

Improved #64 Hand Gummer sharpens all types circular saws 4" to 20" diam. Ideal for saw shops. Self-Centering adjustment for quick, easy set-ups. Complete with 1/4 HP motor, 1 grinding wheel & cord. **$79.50** FOB Portland. Wt. 70#. SEND FOR FREE LITERATURE.

**P. T. HOBBS MACHINERY**
8375 N. Interstate Ave. PS-122, Portland 17, Ore.

4000 fine tools, available direct from factory to user. Snap-on catalog free— send for it today.

**Snap-on Tools Corporation**
8060-L 28th Ave., Kenosha, Wis.

# KING MIDGET

WORLD'S LOWEST PRICED 2 PASSENGER AUTO

Drive it for 75c per week. Amazing performance. Surprising comfort. All steel construction. Ready to run or assemble it yourself with our bolt together parts. Rider Agents wanted, earn your car Free. Send 25c for detailed literature or $1 (refunded first order) for actual assembly book and service manual filled with photos, drawings, specifications, etc.

**MIDGET MOTORS MFG. CO.** *ATHENS, OHIO*



Copyrighted material

**FREE** CATALOG OF GOV'T SURPLUS

**THE COMPLETE POWER TOOL ACCESSORY SET**

**100 PIECES 4.98**
Post & Hand. 50c

for all ¼ capacity Electric Drills and Motor Chucks. Kit Contains: Grinding Wheels, Drills, Reamer, Mounted Stones, Polishing Compound, Buff Arbors, Rotary File, Steel Cutters, Circular Saws, Cutoff Wheels, End Wire Brushes, Polishing Wheels, Honing Stones, Sanding Cloth and Paper, Wire Wheels, Sanding Discs, and other useful items.

**ELECTRIC *Handi-Sprayer***

Latest! The only PRECISION-BUILT Sprayer of non-corrosive materials on the market today! . . . *With A Life Time Service Guarantee.*

Features adjustable SWIVEL nozzle. Ideal for use with Paint, Varnish, Lacquer, Insecticide, Disinfectants, Water and Water Based Chemicals. 110 volt, A.C. only. **8.98** Post & Hand. 50c

**PENCIL SHAPED**
true tempered TOOLS

ideally suited for working in almost every medium Metal, Plastic, Wood, Leather, Clay, Stone, etc. Our set of 8 NEW GOV'T SURPLUS DENTAL INSTRUMENTS worth almost $20.00, yours for only **1.98** Post & Hand. 25c

150 PIECE grinding, polishing, buffing and sanding Kit for all power driven tools. only **98¢**
Post & Hand. 20c

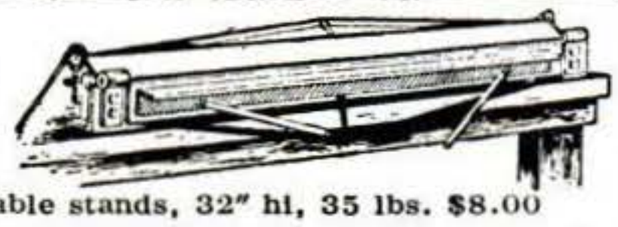
Kit contains: ¾" Circular Saw with Mandrell, 2 Mounted Stones, 2 Burs, 2 Honing Stones, Unmounted Grinding, Rubber, Cut Off and Felt Wheels and Cylinders, Cloth and Paper Sanding Discs, and 2 Mandrels to accommodate the unmounted items.

BARGAIN MIXES—All New Merchandise—Add Post. & Hand.
Set of 12 New Files up to 14" . . . . . 2.99 Post & Hand. 50c
10 ass't. Taps up to ⅝" . . . . . 1.98 Post & Hand. 25c
15 ass't. Drills up to 5/16" . . . . . 98c Post & Hand. 20c
6 ass't. Round Dies 11/16" to 2" outside dia. . . . . 1.98 Post & Hand. 25c
5 ass't. Taper Pin Reamers ¼" shanks . . 1.98 Post & Hand. 25c
$10.00 list value of Abrasive cloths . . . . 98c Post & Hand. 25c
**100** ass't. ⅛" and 3/32" shanks, mounted stones and steel cutters . . . . . 9.98 Post & Hand. 50c

Dental Specialty & Sales Co., Dept. PS4 P.O. Box 692. Great Neck, N.Y.



**SHEET METAL BRAKES**



Angles, flanges, Pittsburgh locks. 24 G. steel, heavier aluminum. Cam locking, mount on bench, truck or floor stand. Truss braced steel. Express collect. 30", 65 lbs. $35.50. 36", 75 lbs. $40.00. 48", 100 lbs. $56.00. Portable stands, 32" hi, 35 lbs. $8.00

IRON BENDER

**IRON BENDER** forms hooks, angles, eyelets, etc. Capacity ¼x2", 5/16x1½", 10 parts, all steel. Express Collect . . . . . **$9.50**

**24" CURVE FORMER.** Forms straight and tapering pipes 2" to 2 ft. dia. 16 Gauge. Express collect. **$9.50**

*(Immediate delivery. Order direct, cash or C.O.D., or send for folder.)*

VYKE BRAKE CO., S-3016 Leavenworth, Omaha 5, Nebr.



**WELD-BRAZE CUT-SOLDER**

**4 Ways to Handle 1001 Repairs Around Home-Garage-Garden**

Complete welder with Twin Carbon Arc Torch and all operating accessories to do all types of metalcraft work. Easy instructions for work on iron, steel, bronze, brass and aluminum. Plugs into any properly wired AC or DC line Low cost pays for itself in money saved and earned A wonderful practical Gift of a lifetime. Order now!

*only* **$14.75**
f.o.b. factory
*Larger Models Available on request.*

**FOUR WAY WELDER CO.**
2326 S. Michigan Ave.
Chicago 16, Ill. Dept. F3-NC

**4** *way welder*
Yours on a money back
**10 DAY TRIAL**



*New 1953 Edition!!*

**FREE 32 PAGE MICROSCOPE CATALOG**

**COMPLETE 10 PIECE MICROSCOPE SETS AS LOW AS $6.95**

World's greatest values in microscopes, accessories, prepared slides, magnifying glasses, telescopes and binoculars. Professional quality equipment at prices everyone can afford. Send for it!!! An introduction to the priceless, never ending adventure of the invisible world of the microscope – a thrilling hobby that leads directly to many fascinating careers.

★ *Christmas Delivery Guaranteed*

**ON MODELS ILLUSTRATED BELOW AND CATALOG PURCHASES IF YOUR ORDER IS POST MARKED BEFORE DEC. 15.**

**40 TO 600 POWER!!**

***In 15 Different Combinations****

**MODEL #635 MICROSCOPE**

**$29.95 Ppd.****

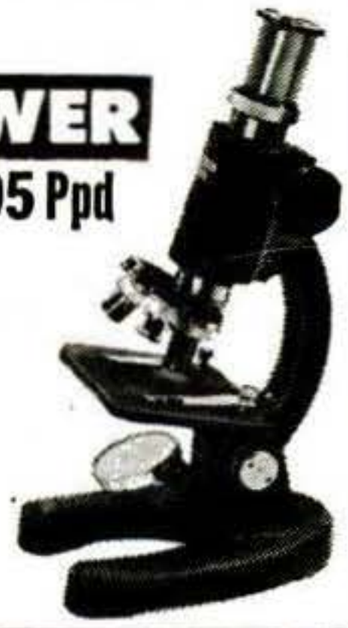
In fitted hardwood case. As illustrated with 15X eyepiece, 10X, 20X, and 40X achromatic objective lenses (allowing 150X, 300X, and 600X) **less mechanical stage. Every feature needed for advanced university, pre-med, medical school use

**Set of Extra Eyepieces $9.95 Ppd.**
**MODEL #240**
4X, 5X, 8X, 12X in fitted hardwood case
*Giving a total of 15 different combinations from 40X to 600X. Ground • Polished • Achromatic.

**MODEL #240 MECHANICAL STAGE FOR MODEL 635 $14.95 Ppd.**
Allows calbrated slide movement microscopically right, left, up or down.

**100-200-300 POWER**

**Model #300 Microscope $14.95 Ppd**



Select your 100, 200 or 300 power on the triple revolving turret for scientific work with the microscope. A lifetime bargain for students, schools, amateurs, labs. Ground, polished, achromatic lenses. All metal, precision construction. We doubt that you will find a comparative optical instrument for less than three times this amazing low price.

MONEY-BACK 10-day guarantee on all items. Send Check, cash or money order. C.O.D.'s 20% deposit required. Calif. residents add 3% state tax.

the AKRON 4400 SUNSET BLVD. LOS ANGELES 27, CALIF.
OPTICAL DEPT. 12-S




Copyrighted material

# Give the Best...WISS!

**for all sheet metal cutting**

## WISS Metal Master Compound Action Snips

#M-3 Easily cuts 18 gauge sheet metal. Cuts curves and circles as well as straight. Ideal for the home workshop. $4.25. Rubber grips recommended, 60¢ extra.

### WISS "Hy-Power" Pruners

#908 Pruning shears cut easily and cleanly. Non-pinching pistol grip handles. Soft anvil keeps knife blade sharp indefinitely. Choice of professionals. $2.50

### WISS Combination Snips

#V-13 Solid steel, with gray japanned handles. Cuts curves and irregular shapes with ease. Handy pocket size. 7" long. Accurately tempered jaws and strong bolts. $1.85.

*Prices slightly higher Denver and West*

WISS NEWARK, N.J.

*Quality for more than a Century*

**J. WISS & SONS CO. • NEWARK 7, N.J.**

---

# Make lasting Metal Repairs

WITH →

**FREE:** "Soldering Simplified." 16 page illustrated booklet. Get your copy now.

**Kester Solder Company**
**4254 Wrightwood Ave.**
**Chicago 39, Illinois**

---

MAKE MONEY **SELLING** Eshelman Tractors Plowing Snow From Roads and Driveways

RAKES
PLOWS
CULTIVATES
HARROWS
HAULS
SPRAYS
SAWS
DOZER
MOWS
CUTS
ROLLS
TILLS
SNOW PLOW

**ESHELMAN**

FROM $95 PLUS TOOLS

1½-3-6 H.P.

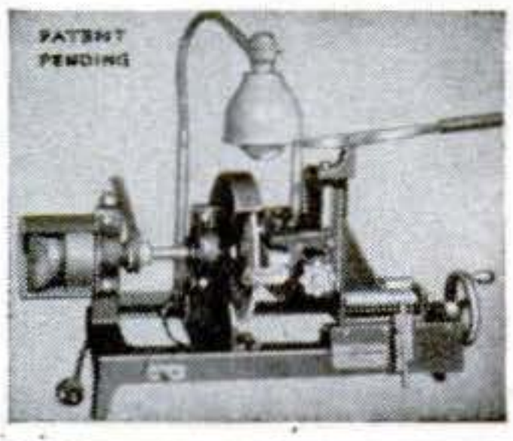
MAKES WINTER JOBS EASIER

Also SNOW BLOWERS RIDING TRACTORS & POWER REVERSE

Women can operate it.

Free Catalog. Write Eshelman Co., Dept. 296 119 Light St., Balto. 2, Md.

---




## Start a NEW BUSINESS!

**or Add to your present Repair Business**

**SHARPEN DULL PIPE WRENCHES**

**PIPE TAPS & DIES**
**"GUM" CIRCULAR SAWS**

*Write for Information*

**J. C. MOORE INDUSTRIES**
**BOX S 276, Fredonia, Pa.**

---

## 1953 EDITION

It's New! It's Different! Get world's largest Auto Accessory & Parts Catalog and save money. Over 50,000 items, including Hollywood Accessories, Hi-Speed Equipment, Rebuilt Engines, all parts & accessories for all cars & trucks. We have that Hard-To-Get part! Jam packed with bargains. Completely illustrated. (100 pages) Send 25c (refundable).

**J. C. WHITNEY 1917-F Archer Chicago 16**

---

## Print Your Own

Cards, Stationery, Advertising, labels, circulars, photo and movie titles, church work, tags, etc. Save money. Sold direct from factory only. Raised printing like engraving, too. **Print for Others, Good Profit.** Have a home print shop. Easy rules supplied. Pays for itself in a short time. Write for free catalog of outfits and all details.

KELSEY **PRESSES, N-33, Meriden, Conn.**

---

*SAVE MONEY • SAVE FUEL • BE WARMER*

# STORM WINDOWS

*OF GENUINE* **DU PONT** *CELLULOSE ACETATE*

**5 WINDOWS for $6** POSTPAID

- **CLEAR AS GLASS** *No cloudy vinyl plastic effect—but as transparent as the windows it covers.*
- **INSTALL IN MINUTES . . . FROM INSIDE** Scissors and Scotch tape are all you need. No climbing ladders for outside installation! No marring of window sills with tacks. Simply tape on . . . as easy as mending a page!
- **PERMITS AIRING OF ROOMS** *Just lift off tape when open window is desired . . . Replace when window is closed.*

***100% AIRTIGHT*** — Used by the U.S. Gov't. Fit any window. Roll size 36" x 288". Sheets easily taped together to cover wider windows. Completely waterproof . . . Instructions furnished. They'll pay for themselves many times over in fuel savings alone. Fill in and mail the coupon TODAY.

**SEND NO MONEY!**
*Pay Postman*
**YOUR MONEY BACK IN FULL IF RETURNED IN 10 DAYS**

T. C. TOR, 2113 Bellevue St.
Phila. 40, Pa., Dept. PS3

GENTLEMEN: Please ship immediately ( ) rolls (ea. roll 36" x 288") — at $6. per roll of TOR Plastic Storm Windows . . . ea. roll enough for five average size storm windows — with instructions.

( ) I will pay postman $..... plus few cents postal collection fee.

( ) Am enclosing payment herewith (saving collection cost)

Name .....

Address .....

City .....

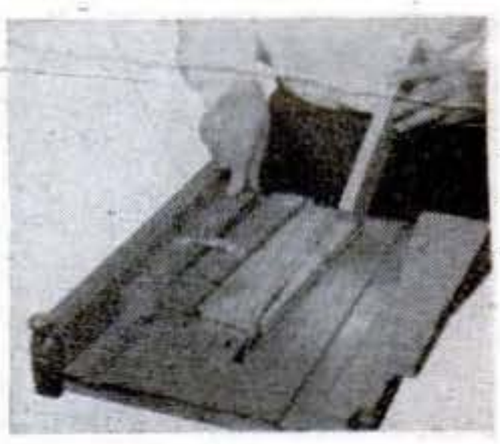
---

# HOBBYISTS—ATTENTION!!!

No more jigs to make! Save time and money! HERE'S THE ONE SIMPLE ADJUSTABLE JIG FOR ALL ANGLES, from 0° to 22°. Cuts angles in 5 seconds. Guaranteed accurate. Fits all power saws. GIVES STRAIGHT PERFECT ANGLES EVERY TIME. Ideal gift.

ONLY **$2.95** postpaid

**HOBBYIST ADJUSTABLE JIG COMPANY**
**90-29 184TH PLACE,**
**HOLLIS 23, N. Y. DEPT. P**

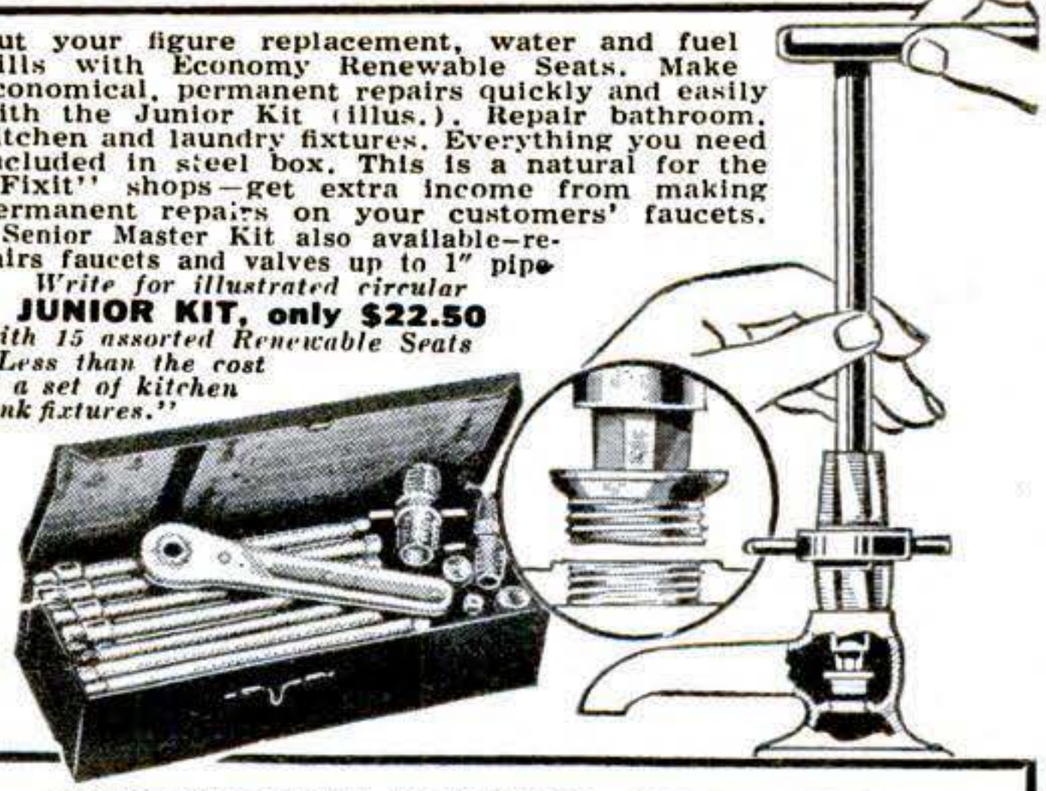


Money Back Guarantee if not delighted. Send check or Money Order Now!



Copyrighted material

## STOPS LEAKS *PERMANENTLY*



Cut your figure replacement, water and fuel bills with Economy Renewable Seats. Make economical, permanent repairs quickly and easily with the Junior Kit (illus.). Repair bathroom, kitchen and laundry fixtures. Everything you need included in steel box. This is a natural for the "Fixit" shops—get extra income from making permanent repairs on your customers' faucets.

Senior Master Kit also available—repairs faucets and valves up to 1" pipe.

*Write for illustrated circular*

**JUNIOR KIT, only $22.50**

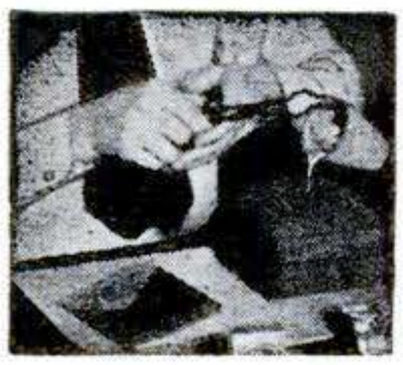
*with 15 assorted Renewable Seats*

*"Less than the cost of a set of kitchen sink fixtures."*

**ECONOMY VALVE SEAT CO.**

**1426 N. Keating Ave., Chicago, Ill.**

---



## BRONZE FOUNDRY

***Schools and Home Workshops***

Make your own castings of aluminum, copper, bronze, silver. Foundry sets are available in three sizes including 2400 Deg. F. blast Furnaces, $22.50; $29.50; and $42.00. f.o.b. Kansas City. Free Circular.

**KANSAS CITY SPECIALTIES CO.** P. O. Box 6022, Dept. S-12 KANSAS CITY, MO.

---

## DRAINS Cellars, Laundry Tubs; CIRCULATES Oil; IRRIGATES Gardens

Original "Type P" Pump has 2400 GPH capacity. 360 GPH 75' high, or 1500 GPH from 25' well. Use any 1/8 to 1/2 HP motor. DOES NOT CLOG.

**See Popular Science, August, Page 200**

Only $6.95 postpaid if cash with order. (West of Mississippi, add 50c.) **$6.95** Motor coupling included.

MONEY BACK GUARANTEE!

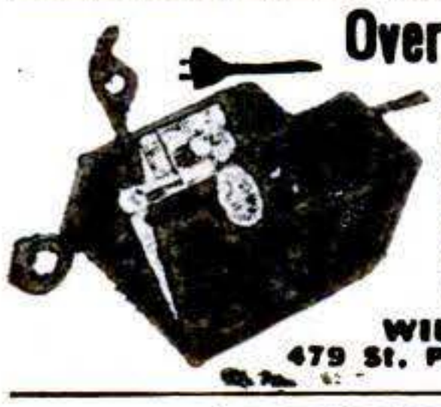
**Also Gear Pumps in all sizes.**

**LABAWCO PUMPS, BELLE MEAD 3, N. J.**

---

## ELECTRIC SHEAR SHARPENER

### Over 85,000 Sold—It Must Be Good



Genuine Carborundum wheel ideal for shop or home use. Send remittance with order and shipment will be made at once, prepaid to your door, complete with electrical goods catalogue.

Motor driven **$9.75** complete with vise

**WILLIAM MARVY COMPANY, Dept. 90**
479 St. Peter Street St. Paul 2, Minn.

---

## BUILD YOUR OWN ARC WELDER OR LIGHT PLANT

D-C GENERATOR

Sells $250 to $500

**$15.50** Instruction included. Rated 200 Amps., 28 volts, 2500 R.P.M. Ship Wt. approx. 50 lbs. Stock No. 707.

F.O.B. K. C. MO.

CONVERTS TO ARC WELDER 300-350 AMP. OR LIGHT PLANT CAP. LOAD 7000 WATTS

**Stock No. 711 D. C. Generator R-1 Jack & Heintz, rated 300 Amp. 30 Volts.**

Gov't cost $300.00. Instruction for converting to welder or light plant incl. Also instructions and diagram for converting the R-1 or Delco generator to **Combination Welder and Light Plant Included.** Only..... **$25.50**

**ELECTRIC MOTOR** 1/2 H.P. 27 V. D.C. R.P.M. 4000. No. 70. For intermittent or continuous duty. Shaft ext. 2 1/4". Variable speed motor can be adapted to 110 V. A.C. by simply arranging armature brush leads. New Instructions incl. ..... **$5.95**

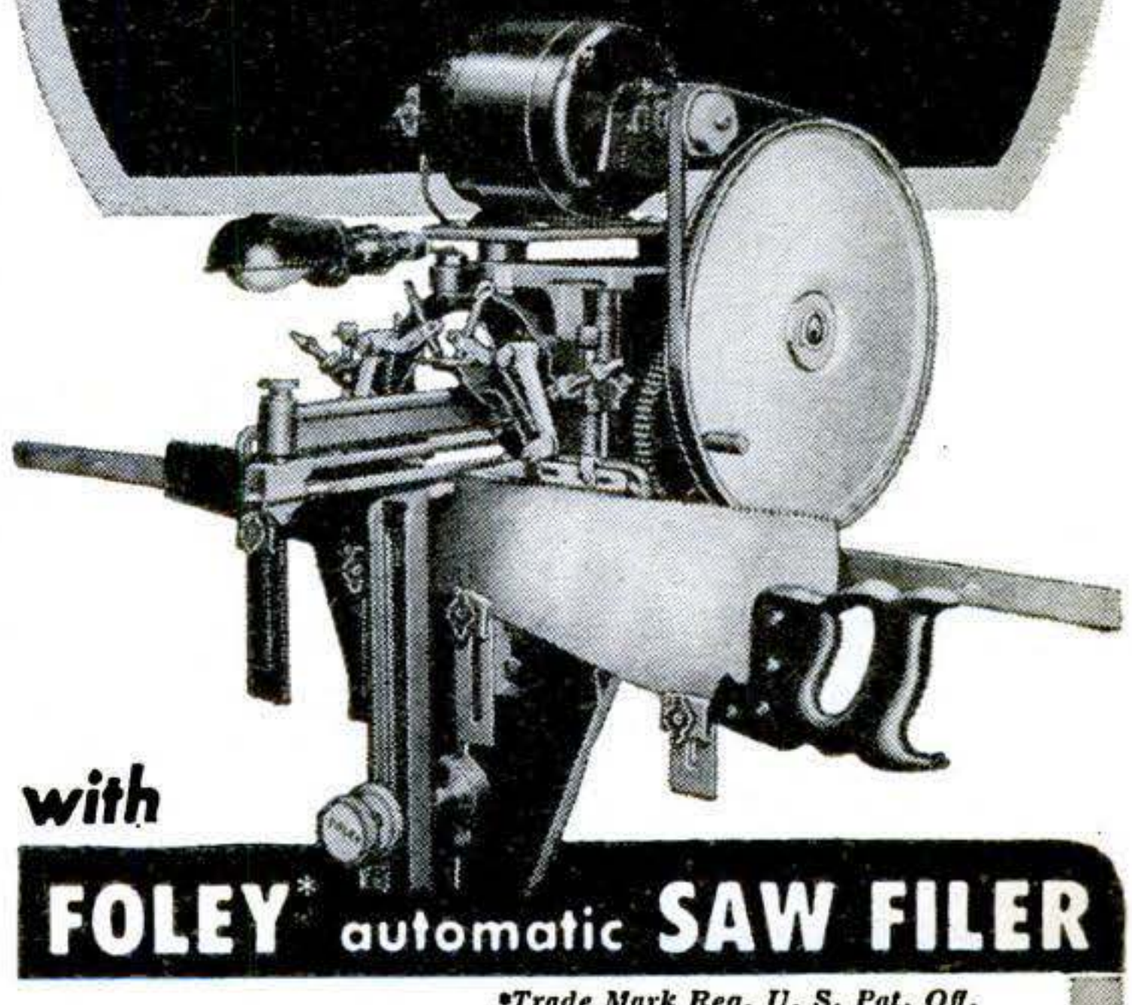
*Prices f.o.b. KC Mo. Send check or M. order.*

**GENERAL SALVAGE CO.**

**Dept. 230, 2022 E. 27 St., Kansas City, Mo.**

---

# *Made* $900 IN SPARE TIME



**with FOLEY* automatic SAW FILER**

**Trade Mark Reg. U. S. Pat. Off.*

"I did very well last year with my Foley equipment, about 950 saws in my spare time. About $900 for me."—Leo H. Mix. "I have done 4 or 5 thousand saws in my spare time in the 4½ years since I got the outfit, and they are all coming back."—says Len Crego.

**Make up to $3 or $4 an hour in spare Time.**

With the high prices of food, clothing and everything else, just think what you could do with extra money every week! With a Foley Automatic Saw Filer you can file hand, band and circular saws better than the most expert hand filer. "The first saw I sharpened with my Foley Filer came out 100%"—writes Clarence E. Parsons. Every saw you sharpen with the machine accuracy of the Foley Saw Filer is an ad that brings you more customers. Cash business, no canvassing. No eyestrain, no experience needed.

### FREE BOOK

### "MONEY MAKING FACTS"

Shows just how you can start at home in spare time in your basement or garage. Just think—with a small investment, no overhead, no stock of goods to carry, you can get right into a cash business—and later on develop into a full-time repair shop. Send coupon today for this practical plan. No salesman will call.

*Send for* **FREE BOOK**

**FOLEY MFG. CO., 1219-2 Foley Bldg., Minneapolis 18, Minn.**

Send FREE BOOK—"Money Making Facts"

Name.....

Address.....



Copyrighted material

## Does MORE Jobs EASIER than any other Tool!

**A useful** gift, a MAN'S gift — to make him an Expert Fixer! Vise-Grip locks to work with Ton-Grip. Won't slip! Turns, twists, pulls, cuts, ratchets. A whole tool kit in one trim tool! 7" and 10", with or without cutter. Only $1.85 to $2.60 at your hardware dealer.

Manufactured Only By
**PETERSEN MFG. CO., INC.**
Dept. M-12 DeWitt, Nebr.

---

**OK** *Save Money, Assemble 'em Yourself!*

## Model Plane Engines

● Here's a buy for you modelers who like to tinker. Assemble your Cub .049 with an OK Power Kit—a $6.15 value for only $4.95. By saving **us** the cost of assembling, **you** learn the principles of internal combustion engines . . . have the fun of building a real powerplant from prop to fuel tank . . . **and Save $1.20!**

● On a weight/output ratio these famous record-smashing Cubs equal a full-size aircraft engine in power. They weigh as little as 1½ oz.—develop up to 15,000 rpm! Crankcases are exceptionally rugged — cylinders and shafts are crashproof. **Fully guaranteed.** Available in two types of money-saving kits . . .

**OK CUB .049 POWER KIT**

Kit contains:

| | |
|---|---|
| .049 Cub (Unassembled) value | $5.25 |
| Combination engine mount and fuel tank, neoprene tubing ..... value | .50 |
| Spin Starter ..... value | .25 |
| Propeller ..... value | .15 |
| **Total Value** | **$6.15** |
| **Your Cost** | **4.95** |
| **You Save** | **$1.20** |

**COMBINATION PACKAGE**

(Includes assembled engine, prop and tank.)

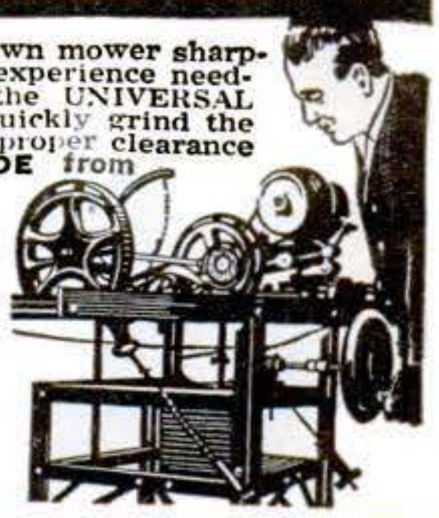
| | |
|---|---|
| Cub .039 . . $4.95 | Cub .074 . . $6.75 |
| Cub .049 . . $5.75 | Cub .099 . . $7.75 |

See your Hobby Shop Dealer. If not available send check or money order. Add 25c for postage. Sorry, no C.O.D's.

**Herkimer Tool & Model Works, 176 Harter St., Herkimer, N.Y.**

---

**MAKE *Big* MONEY WITH THE *Universal* LAWN MOWER GRINDER!**



Enjoy a profitable lawn mower sharpening business of your own. No previous experience needed. Place a hand or power mower on the UNIVERSAL GRINDER. With only **ONE SET-UP** you quickly grind the stationary blade and all the reel blades to proper clearance **WITHOUT REMOVING A SINGLE BLADE** from the mower.

**PROOF** G. Spurlock, of Arkansas, writes: "I have my Universal Grinder two months and made a net profit of **$227.00**". C. E. Hardy of Miss. writes: "I am doing a fine business with the Universal Grinder. I spent 40¢ for a newspaper ad and have done nearly **$500.00** of business." Write today for FREE FACTS about Big Profits in Lawn Mower Sharpening.

**ROGERS MFG. CO., DEPT. P-122 LINDSEY, OHIO**

---

## $750 BUILDS 4 ROOMS & BATH!

**WHY PAY RENT?** **For Seven Hundred Fifty Dollars and 30 days of your spare time, you can build yourself this Beautiful Home.**

Living room, 11x15, Front bedroom 9x11, Back bedroom 10x12, Kitchen 9x11, Bath 5x8, Hall 3x4, Wind out steel casement windows, Concrete block, stuccoed. Illustrated pictures, step by step instructions, blueprint and material list, $1.00. Money back guarantee.

**L. H. FARROW, Dept. D**
**Box 645 Columbus 16, Ohio**

---

**SAVE ON TOOLS** — **SPEED-HED** *Ratcheting* (NO MOVING PARTS) *COMBINATION WRENCH* — **MECHANICS NET PRICES**

**HERE'S WHY "SPEED-HED" IS 3 TO 5 TIMES FASTER!**
**"SPEED-HED'S"** Open end never leaves nut . . . actually ratchets in place!
**CAN'T SLIP! FULL TURNING POWER! GUARANTEED!**
**SD-2 5 pc. MASTER SET** 3/8, 7/16, 1/2, 9/16, 5/8" . . . . . **$5.90**
**SD-3 7 pc. SUPER SET** 3/8" to 3/4", inclusive by sixteenths . . . **9.40**
**SEND $1.00 DEPOSIT** (refunded on first $9.00 purchase) for 1953 leather bound, loose leaf **CATALOG.** Hundreds of MECHANICS' specialty tools illust.: **MINIMUM "Net"** Prices as recommended by manufacturers for professional mechanics! **FACTORY GUARANTEED!** Not War Surplus.
**MERCURY TOOL CO., 122 Golden Gate., San Francisco 2, Calif.**

---

---

*Build your own* **SMITH Compressor**

**Operates spray guns, rock drills, tampers, paving breakers, sandblasting . . . Uses only 1 gallon of gas an hour!**

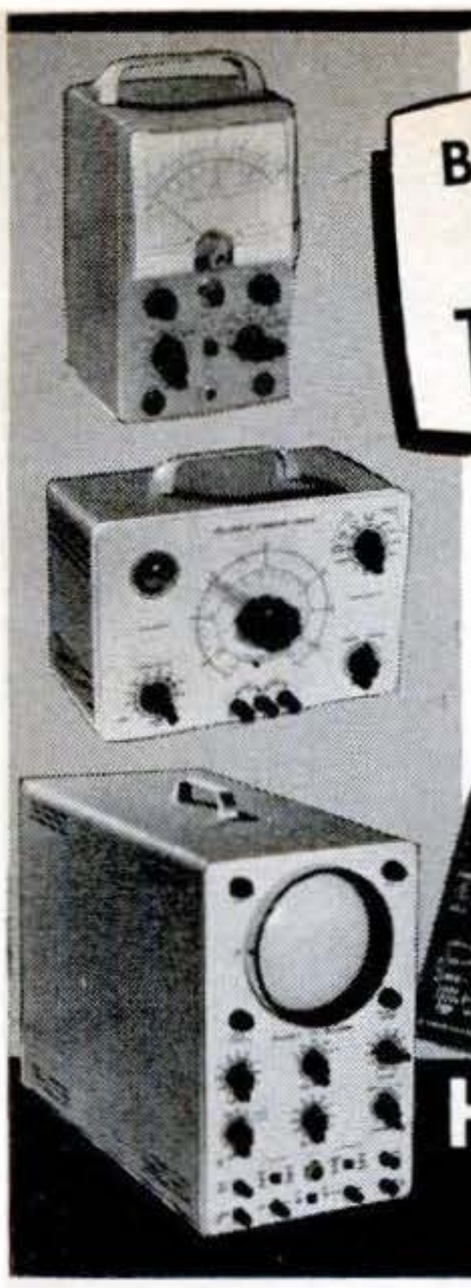
*Save Money*—build your own Smith Air Compressor! Famous the world over! Capacity 60 cu. ft.; pressure up to 100 lbs. per sq. inch. Just order the Smith Compressor Head and Accessories with complete instructions for assembling. All you need is a Ford Motor and shop facilities. Head equipped with high speed compressor valves; automatic unloading and idling.

*Write for complete information!*

**GORDON SMITH & COMPANY, Inc.**
405 College Street • Bowling Green, Ky.



Copyrighted material



BUILD YOUR OWN
*Heathkit*
TEST EQUIPMENT

Heathkits are completely engineered instruments supplied unassembled. Every kit goes together smoothly and easily. All drilling, punching, and painting has already been done for you. All parts are furnished and are of highest quality.

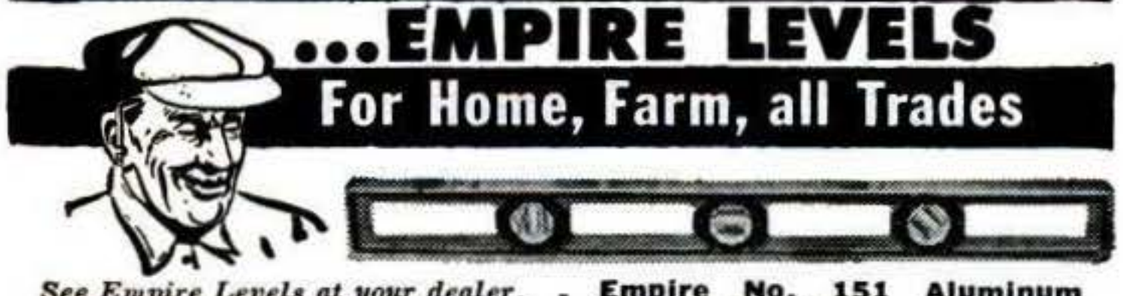
Detailed construction manual shows clearly where each wire and part goes and tells exactly how to build the kit.

**WRITE FOR FREE CATALOG**

**HEATH COMPANY**
BENTON HARBOR 16, MICHIGAN

---

**Buy the Mechanic's FIRST Choice**
**...EMPIRE LEVELS**
**For Home, Farm, all Trades**



*See Empire Levels at your dealer, or write for Catalog Pages of New Empire Levels.*

**Empire No. 151 Aluminum Level: Adjustable vial cases, twin levels, plumbs, 45° vials —24"—$7.50.**

EMPIRE TOOLS

**EMPIRE LEVEL MFG. COMPANY**
**10930 West Potter Rd., Dept. PS., Milwaukee 13, Wis.**

---

**6 GREAT SHAW "DU-ALL"**

Plow
Plant
Cultivate
Mow
Rake
Cut Trees
Saw Wood

**Walking or Riding Tractors**
1½, 3, 5 H.P. walking models. 5, 8, 12 H.P. riding tractors. Get just the power you need in Shaw extra strength superior traction machines. All wanted tools, attachments. Dependable for nearly 50 years. See a Shaw dealer. Write for **FREE literature,** low prices—today.

**SHAW Mfg. Co.** 5712 Front St., Galesburg, Ks. 668-PS N. 4th St., Columbus, O.

---

**DO MORE PLANING JOBS WITH LOW-COST BELSAW $215.00**

**AMAZING 12¼-IN. PLANER Does All Ordinary Planing Mill Jobs.** Provides attachments for Jointing, Rabbeting, Tongue, Groove, Matching. 12¼ x 6-in. capacity, 3-knife solid round all-steel cutterhead. Power feeds at 24 feet per minute, 42 cuts per inch. Provides for full line of accessory attachments—Grind and Joint knives IN THE CUTTERHEAD WITHOUT REMOVING.

**FREE BOOK**

**BELSAW MACHINERY CO**
1022 Field Bldg., 315 Westport Rd., Kansas City 11, Mo.

---

**WAR SURPLUS** AND OTHER BARGAINS — **SAVE UP TO 90%**

**LOW VOLTAGE CIRCUIT TESTER**

**Made for U. S. Ordnance Dept. to rigid specification. Portable steel hand-carrying unit is a self-contained trouble shooting device for making a complete and rapid check of the generator battery circuit, incl. any circuit & voltage regulators. Battery voltage. regulators, cut-out settings & generator performance easily determined. It's great for garages, mechanics, truck fleet owners, boat and marine mechanics. Can be used on any 6 or 12 volt system. Approx. Govt. cost $175. NEW. Complete with instruction book, only $32.50. Shpg. Wt. 20 lbs.**

**"HELIOS" ORIGINAL TOOLMAKERS VERNIER CALIPERS**

ULTRA PRECISION—Imported for the really critical mechanic who must have the best. Recommended and used by experimental and research machinists at Lockheed, Douglas, Bendix, GM, RCA, GE. ALL NEW and at low, low prices . . . but quantity is limited! Model 51-Genuine Helios. Hardened lapped precision surfaces. 1/1000" and 1/10 mm graduations. Has handy slide roll and thumb lock. Quick accurate depth. A $35 value, it's yours complete with leather carrying case for just **$6.95.**
Model 64-Helios 8". Glass hardened lapped jaws. Inside, outside measurements. 1/28" and 1/1000" verniers. Thumb guide and lock screw. A $45 value at the amazing price of **$7.50.**
Model 65-Helios 8". Glass hardened lapped jaws. Inside, outside measurements. Thumb guide and lock screw. Valued at $50, on sale while they last, for **$8.50.**
Model 76-Helios 8" Depth Gauge. Graduations 1/1000". Glass hardened. It's worth every bit of $25, yours now from Airborne for **$6.50.**

**D.C. GENERATORS**

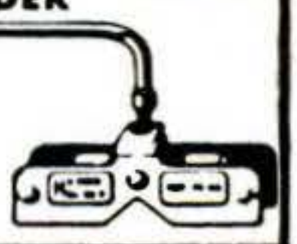
Finest aircraft quality . . . heavy duty . . . lifetime grease-sealed ball bearings. Terrific for truck and marine use, for welders, plating, D. C. Appliances, lights, etc.
Type P-1. Mfd. by Ford, General Electric, Westinghouse & Delco-Remy. Rated 200 Amps., 28 Volts, 2500 RPM., can be "reved" up to 300 Amps. Shpg. Wt. 53 lbs. Approx. Govt. Cost $350 . . . New to you----------$21.50

**MICROMETERS**

Chrome plated, precision engineered, carefully tooled to give long life. All new 0-1" capacity—**$2.25 ea** 1-2" capacity—**$3.50.**

**HIGH SPEED DRILLS. ALL NEW.** Fractional and numbered. Orig. value $18. Nationally known brand. Assorted sizes. Set of 30 just **$3.50.**
**WIRE GAUGE DRILLS**—From 45 to 60. Highest quality steel. You'll recognize the brand. Hard to get sizes valued at $7.50. Airborne gives you a set of 12 for **$1.75**

**MAGNETIC BASE INDICATOR HOLDER**



For all types of dial indicators with guaranteed lifetime ALNICO magnets. V-slotted base has a 45 to 50 lbs. pull, permits immediate application without clamps or special attachments and mountings can be made on cylindrical surfaces. For machinists, tool-makers and inspectors. Base 3½" long by 1⅛" wide. NEW. ----$3.50 ea.

Send 25c for 1952 catalog. Bargains for everyone. Check, Money Order or Cash. 25% deposit on C.O.D. orders. Prices F.O.B. Culver City, Calif., unless otherwise stated.

**AIRBORNE SALES CO., INC., Dept. PS1252**
8501 Stellar Dr. Culver City, Calif.

---

**LOOK FOR THIS SELF-SERVICE DISPLAY**

Fuller's famous unbreakable amber handles top the finest steel screw drivers and wood chisels. Fully guaranteed. At hardware stores everywhere.

Now! With NEW "Blisterproof" DOME

Wholesale Distributors! Write for Catalog Pages & Prices.
**FULLER TOOL COMPANY, INC., 3522 Webster Ave., Bronx 67, N. Y.**
World's largest makers of Amber-Handle Tools
EXPORT SALES DEPT., JOHN H. GRAHAM CO., 105 Duane Street • New York, U. S. A.

---

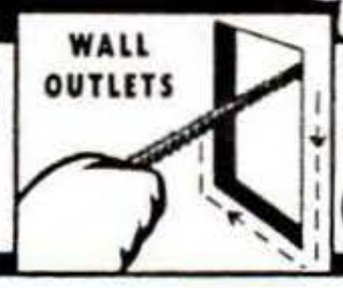
HOME WORKSHOP

DEALER INQUIRIES INVITED

**New Gimlet HOLE SAW AND CUTTING TOOL**

Patent Pending

WALL OUTLETS



14½ IN. LONG

only $3.50 Postpaid

*A 5-in-1 hand tool with a hundred uses.* Drills, saws, reams, rasps, files all wood, conduit and plastic. Praised by electricians, hobbyists, plumbers, carpenters. Has a tough plastic handle—drill point—8 inch case-hardened carbon steel spiral cutting blade. *Money Back Guarantee.* Send cash, check, or money order to . . .

**THE A & F MANUFACTURING CO., BOX 323M, ST. JOSEPH, MICHIGAN**




Copyrighted material

# Increase "gas" mileage!

**10 DAY FREE TRIAL IN YOUR CAR**

This new air-bleed idling jet replaces present solid idling adjustment screw in your carburetor. The object is to lessen the vacuum in the idling channel by bleeding air during high manifold vacuum periods and thus, try to increase Your Gas Mileage. ABOUT 1/2 MILLION NOW IN USE. Most users who write us swear by them and some report up to 25% more mileage. Many comment on Smoother Motor, Easier Starting, Faster Pick-Up, Better Idling. But some swear at them with "No Improvement" and fire "the little stinkers" back—proving Gane's can and do sometimes fail completely. So we invite you to try "the little stinkers" at "no cost", to see what they will do for you. Make NO deposit. Send NO money. Pay postman NOTHING. There are NO reservations, qualifications nor restrictions to this TRY BEFORE YOU BUY 10 DAY FREE TRIAL OFFER. Just mail this coupon today. GANE NEEDLES, with literature, will be promptly sent you postage paid. You, or your service station, can quickly make the simple, easy installation.

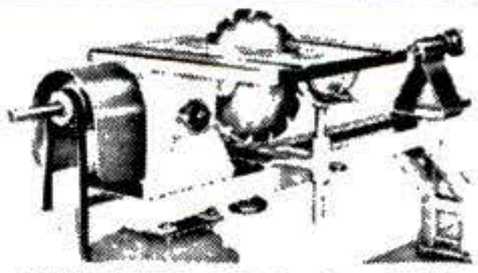
**USE GANES 10 DAYS**—Check for increased gas mileage which must average 2 or more extra miles per gallon. At the end of ten days send us only $1.50 per Gane Needle in check, currency or stamps or else send them back and owe nothing!

**OCTA-GANE, Dept. SG-12,**
**605 W. Las Tunas, San Gabriel, Calif.**

Name.....
Address.....
City.....Zone....State.....
Year & make of car.....No. cyl.....

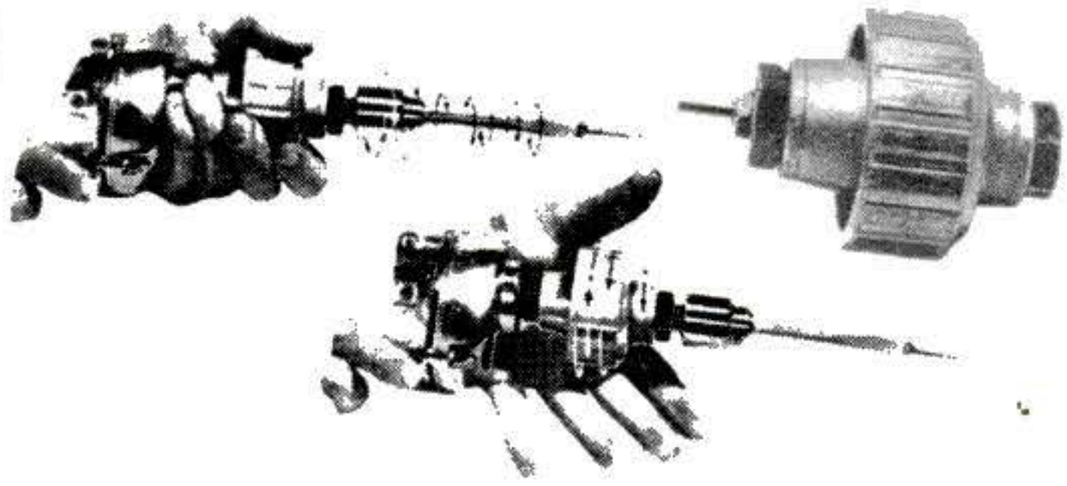
**RETAIL PRICE $125.00**

**FACTORY TO YOU $79.95**



**SUPERSHOP** includes precision-built 8" tilting table saw, vertical and horizontal drill press, 30" lathe, sander, grinder. **100% BALL BEARING.** Write for FREE catalog, full details, trial plan.

**POWER TOOLS, INC.** 242 YATES AVE. BELOIT, WISC.



## 5-to-1 Speed Reducer Fits Any 1/4" Drill—

Convert your 1/4" electric drill to electric screwdriver—drill holes to 1 1/4" in wood, to 1/2" in masonry. Planetary gear system gives tremendous torque increase. Adapters furnished to use 1/4" or 1/2" chuck. Instant starting or stopping with hand clutch control while drill keeps running. To operate tool, simply grip reducer; release to stop. At hardware stores and tool dealers, or $9.95 prepaid from Babcock Mfg. Co., 6259 Claremont Ave., Oakland 18, Calif. Write for free circular.

# HOLD-E-ZEE

The *Original* AUTOMATIC GRIP **SCREWDRIVERS**

**See these popular, high-quality drivers with the exclusive Gripper that holds, starts and sets up screws in unhandy places!**

*New Models* FOR RECESSED HEAD SCREWS

*At Leading Dealers Everywhere*

**UPSON BROS., INC., ROCHESTER 4, N. Y.**

Shoots glaziers' points into hardest wood ask your dealer for **Red Devil** diamond point driver

**RED DEVIL TOOLS, IRVINGTON 11, N. J., U. S. A.**

**$ FREE COURSE! BIG PROFITS! $**

# Flocks & Sandblasts

**Dual Purpose Spray Gun! Uses only 25 lbs. Air Pressure!**

● Thousands of uses in Home, Shop, Industry: Makes Auto Interiors Clean & New, Lines drawers, Marproofs lamp bases, Refinishes any object. All in colorful Flock, Etch & Frost windows, glassware, etc. Removes Paint and Rust from Autos, Tools. Guaranteed! Send **$24.75** or write for free information. **Complete Flocking Supplies!**

Only $24.75 complete

**BLASTO SPRAY GUN MFG.**
**Dept. PS-12, 7007 Haas Ave., Los Angeles 47, Calif.**

**BUILD YOUR OWN** **ARC·WELDER** **NO REWINDING NECESSARY**

**For Light or Heavy Work**

We show you how to build this NEW Powerful welder without rewinding. Uses coils taken from old auto generator. Has 20 heats. Operates on either 110 or 220 volts A. C. Learn to weld. Make money welding for others. Complete plan and valuable catalog 35c.

**LEJAY MFG. CO. 3323 LeJay Bldg. Minneapolis, Minnesota**

# BARRON *Drill Press* TOOLS

ROTARY PLANER

Planes • Rabbets
Tenons • Panels
Routs • Bevels

Only $7.50 COMPLETE

**FOR WORKSHOP AND INDUSTRIAL USES...**

● Over 40 precision built woodworking tools and accessories . . . Hi-Speed Router Bits—Rotary Surface Sanders & Drum Sanders—Safety Shaper Cutters—Dovetail Cutters—Large Auxiliary Metal Tables—All Meta Shaper Fences — Spindle Adapters — Handy Bench Vises. Many other items indispensable for accurate, useful, versatile workshop use. Every tool sold on complete satisfaction or your money back. See your Barron Dealer. Ask for special folder — "24 Extra Uses for Your Drill Press."

**FREE** Workshop Guide & Catalog

**BARRON TOOL CO. INC.**
**366 Architects Bldg., Detroit 1, Mich.**



Copyrighted material

# SAVE UP TO 85% IN WAR SURPLUS

SAVE FOR CHRISTMAS

ORDER BY MAIL TODAY

## 9 PIECE DRAWING SET

Suitable for the architect, student, draftsman, artist etc. Contains 9 separate pieces including: one 5½" compass with pen & pencil parts; one 5¼" divider; one each • 3½" bow divider, bow pencil & bow pen with wheel adjustment & reversible needle point; one 4¼" ruling pen with extra handle; capsule of extra leads. All in a 2 flap, velvet lined pocket book case. **5.98**

## FAMOUS RICOHFLEX VI CAMERA

**10 DAY FREE TRIAL—MONEY BACK GUARANTEE**

*RECOMMENDED AS A TREMENDOUS "BUY" by a leading independent research firm.* Produces results comparable to most expensive reflex cameras. Foolproof to operate. Has all-metal body — leather covered. 80mm precision matched f:3.5 color corrected, coated lenses. Built-in wide field magnifier. ASA synchronized shutter. Speeds: 1/25, 1/50, 1/100 and B. Reflex focusing. Built-in flash synchronization for all standard equipment. Takes 12 exposures, 2¼" x 2¼", on 120 film. *Price includes genuine leather case with "snap-off" front.*

**ONLY 38.50**

## RADIO MIX

A veritable "TREASURE CHEST" for "ham" operators and experimenters. Contains: Headset, Mike Button, Trans. Wire, Insulators, Switches, Condensors, Rheostats, Terminals, Jump Cable, etc. Approx. 8 packed lbs. for ONLY – **2.49**

## USAF THROAT MICROPHONE

Genuine USAF type T-30-0 Gives distinct voice reproduction for aircraft or amateur radio broadcasting. Consists of two microphones, mounted on rubber neckpiece elastic neck nand. Operates between 100 & 300 ohms . . . **1.39**

## NEW POCKET HAND WARMER

The perfect GIFT for Servicemen, Family or Friends. Will maintain temperature of 120° from 16–24 hours by radiation. Uses pocket warmer fluid, lighter fluid or white gas as fuel. Metal Chrome finish with velvet pouch. For Hunter, Skier, Fisherman, etc. **2.25**

## GENUINE ARMY TYPE PARKA

A BARGAIN for those who want the BEST! Same design as used by troops in Korea. Made of durable, waterproof, windproof, heavy duty Poplin. Has a snap-in inner lining of soft fleece for that extra warmth in the coldest weather. Front has 3/4 length zipper closure with button-down outer storm flap. Hood gives complete protection to head. Body has two deep slash pockets and two side pockets all with button-down storm flaps. Sleeves have inner knit wrist bands. Web belt gives a snug fit. Color: Olive green. Sizes: Small, med., large. Small size is ideal for the average woman. Stocks limited – Order TODAY! **34.95**

## 100-200-300 POWER MICROSCOPE

**A VALUE UNSURPASSED ANYWHERE!** Has a triple objective revolving turret. Extra fine micro adjustment. Adjustable plano substage mirror. Body inclinable through 90° for microprojection. in dovetail hardwood case. **13.95**

## 600 POWER MICROSCOPE

Has all the features needed for the finest work. Comes with 3 eyepieces (5x, 10x, 15x). Triple revolving turret has 4x, 10x, 40x achromatic objective lenses. Gives power combinations from 20x to 600x. Also has a square 90 degree inclination stage. Two-side plano & concave substage mirrors. Solid base, precision construction. A regular $150. Value. OUR PRICE complete with fitted hardwood case. **74.95**

## MICROPHONE

Popular telephone type, highly sensitive. Has excellent, clear tone. This was the Signal Corps favorite. An ideal instrument for the Radio "ham" and professional recording studio, for broadcasting, home recording, public address systems, etc. Comes complete with cord & plug. **3.29**

## AIR CORPS TYPE RED HUNTER PARKA

A REAL HUNTER'S FRIEND! You'll "play safe" in this top quality, Hunter's RED Parka. Same design as the Air Corps B-9 Parkas. Outside is fine count, windproof, water repellent poplin. Inside is quilted sateen with 100% wool innerlining. Has 2 deep slash pockets and 2 side pockets – all with storm flaps. Front has full zipper closure with inner storm flap. DUCK and DEER HUNTERS are PRAISING THIS GARMENT. Sizes: Small, medium, large. **18.95**

## SIGNAL CORPS TEL. KEY

The new model J5A with ball type, flame-proof, metal key. perfectly balanced to permit positive contact with minimum effort. An ideal instrument for "ham" or professional use. A BUY at . . NEW **1.89**

## 50 POWER POCKET MICROSCOPE

A Palley Bargain! Has extremely sharp 50 power magnification. Compact, clips into pocket. 4 lens compound optical system. Now examine insects, stamps, minerals, gems, etc. Comes ready to use. **3.49**

## AIR CORPS TYPE LEATHER CAP

Special! For Hunter, Camper, Farmer, All leather with soft, warm sheepskin lining Has turn-down flap for ear protection. Leather covered long visor. Sizes: Small, med., lg. **2.59**

## GENUINE ARMY SKI PATROL PARKA

NEW

Made of heavy, white duck. Wind and water resistant. Slip-over type with draw strings on cuffs and around waist and hood. Neck has 4 tie straps for adjustment. Body is finger-tip length with 2 large outer pockets. Designed to be easily worn over other clothes. Ideal weather protection for the outdoor sportsman, hunter, **2.49**

## MITTENS

Sheepskin lined. Leather outer cover. Ideal for all types of winter work. Small, med., large. . . . **2.69 PR.**

## 20 POWER TELESCOPE

Top quality import. Coated Lenses. Bright, clear image & wide field of view. **8.95**

## ALNICO SPEAKER

Permanent magnet type. 4" diameter. 2 wire hook-up. Ideal for small radios, inter-com systems, test equipment etc. NEW **2.49**

## AIR CORPS TYPE Sheeplined BOOTS

A REAL BARGAIN! All NEW. 100% waterproof and designed to be worn with or without shoes. Lined throughout, including tongue, with soft fleece sheepskin. Water repellent leather uppers with waterproof rubber lowers. Heavy non-skid tread on soles. Full zipper closure. Height approx. 12". Sizes: small, med., large. **13.95**

## "BLUE BUNNY" FLYING SUIT

For winter sports, hunting or "bundling". As coveralls for cold outdoor or farm work. It is 100% woven wool with an extra flannel inner lining for double warmth and utility. Has wiring so fine, flexible, it does not interfere with movements. Can be used with or without heating or can be plugged into car, tractor or truck battery. Sizes: 36 thru 44. **4.95**

## EYE LOUPES 99¢

An indispensible aid in fine inspection work. Available in 2½, 2¾, 3¼, 4 & 5 power. . . . each

## SURPLUS JEEP CANS

FOR RESERVE GAS SUPPLY – Holds 5 GAL. Has screw top and will take standard flexible nozzle. ONLY . . . . . **1.39 EA.**
FLEXIBLE NOZZLE . . . . . .49¢

## ELECTRIC MOTORS

### 606 – DELCO MOTOR

1/50 HP, 24v DC, 1.6 amp. turns 3000 RPM. Has adj. overspeed contactor to stabilize and control speed. Length 5½". Diam. 3". ONLY **4.95**

## NEW! HY-SCORE .177 CAL. AIR PISTOL

Recommended by General J.S.Hatcher in April '52' issue of American Rifleman. No pumping necessary – just cock and fire. Has ALL STEEL rifled barrel, 7-3/4" long. Gives higher muzzle velocity than any other Air gun. Shoots .177 caliber pellets or darts. Ideal for use in shooting small game or targets. **14.95**
Also available in 22 cal. or BB. Write for information on other models.

### SAMSELL MOTOR

27 volts, 16 amps, 1/5 H.P. reversible, series wound on motor. 3800 RPM, shaft 9/32" diameter. 12-spline. 4-1/8" x 2-3/8". NEW ONLY **3.95**

## MAKE YOUR OWN POWER UNIT

Complete Unit

Here's a unit PACKED WITH BRUTE FORCE! Does all those hard, heavy jobs that ordinary power tools cannot handle. Easily made from a vacuum cleaner type motor, a gear reduction drive and a few homemade parts. Can be used for turning large nuts & bolts, digging post holes, drilling large holes in wood or metal, driving power tools & machinery, lifting, pulling, pushing, and any job where a slow speed with high torque is required. YOU CAN'T STALL IT! Lightweight, easy to handle. Has 1000's of uses in home, garage, shop, factory. We supply complete instructions.

**MOTOR 3.25**

**GEAR BOX NEW 12.95 USED 6.75**

### SURPLUS MOTORS

No. 500 – Used 1/2 HP - 27 volt, DC–AC. This motor can be readily adapted to deliver up to 1/2 HP on 110 volts AC by the simple method of rearranging armature brush-leads. Free Diagram with each order. A SENSATIONAL VALUE. **5.95**

## 4 TAKE-OFF DRIVE UNIT

Has many uses where 1 to 4 different take-offs are needed. All four drives turn in unison from the common power input. Drive is adaptable to use with 9/32" flexible drive shafts & accessories. **3.75**

## MARCHING COMPASS

Officer's type with prismatic hair-line guide for sighting at distant objects and at the same time reading degree of setting. Accurate & dependable. Has jewel mounted needle and luminous dial for night use. . . . . **3.95**

## NAVY Sealed Beam SPOT LAMP

U.S. NAVY Portable Search-spot light. Has pistol grip & aiming sight. Makes an ideal search, spot or emergency for auto, boat, camp, etc.

12 Volt light – 4" lens . . . **4.29**

24 Volt light – 5" lens . . . **4.79**

## 230 PAGE CATALOG

**1000's of ITEMS! Fully ILLUSTRATED! For the MECHANIC, SPORTSMAN, HOBBYIST, HOME OWNER, etc.**

War Surplus — Factory Closeouts and General Merchandise Values! Save on Hardware, Hand & Power Tools, Gadgets, Sports Equipment, Hydraulics, etc. **SEND 25c for HANDLING & MAILING.**

**PALLEY SUPPLY CO.** 2263 EAST VERNON AVENUE DEPT. PS-12 LOS ANGELES 58, CALIF.

Order From This Ad. Pay by M.O. or check. P.O's. accptd. from D&B firms. ½deposit with C.O.D's. All Prices FOB Los Angeles.



Copyrighted material

[*Continued from page 85*]

was the uncanny knowledge of geography and postal routes which is the stock in trade of every letter clerk. Each of No. 14's three RPO cars was a separate operating entity, with its own staff of specially qualified men. This car, for example, handled only New York City mail. The one behind it—they call it the "Ma and Pa"—was mainly for Massachusetts and Pennsylvania sorting, and the RPO'er ahead took care of the New York State material.

In order to qualify for one of the "state" cars, a clerk had to know rail and truck routings for mail addressed to as many as 1,200 towns. Without that information, it would be impossible to work the 84 pigeonholes in front of him at the required rate of 30 letters a minute. In the "City" car, street numbers and postal zones take the place of towns and routes, with an interesting complication thrown in. Many New York streets extend through two or more zones and a clerk must be familiar with all of the number breaks.

### *Jokers Keep Them Jumping*

"There are a lot of jokers who still think it's funny to write a cute address," Lavis remarked. "They draw a picture of a column, a bus and a loop. We're supposed to know that's Columbus Circle. Back in the Massachusetts car, Claude Miller got a letter a couple of years ago that really had him stumped. There were only three words on the envelope. The top one was 'Wood,' the middle one 'John,' and the bottom one 'Mass.' Ordinarily we don't beat our brains out on a puzzler like that. But Claude kept kicking those words around and he finally came up with the answer. It was John *Under*wood, *Andover*, Mass."

"Tell him about the 'nixies,'" a clerk called from across the aisle.

Lavis pointed to a special pigeonhole at the top of his case. Already it was more than half-full.

"These nixies," he said, "are misaddressed letters and cards. If you were to run through them you'd find that nine-tenths of the mistakes are the result of carelessness. A fellow in Salt Lake City writes to a New York business house. He's doing fine until he gets around to the state address. Then, from force of habit, he scrawls 'Utah.'"

"How about this Christmas mail? In the last-minute rush I suppose you get a lot of nixies?"

"No," he said. "As a matter of fact the ratio is considerably lower. I'd lay that to the fact that most Christmas mail is addressed from those little notebook lists that most people keep, so they aren't relying on faulty memories and aren't as apt to make mistakes."

### *Morale Is High*

"Funny thing about this service," said Lavis, as he was getting into his street clothes at the end of the run in Cleveland. "It gets in your blood. For the first couple of years it's so tough you're ready to quit at the drop of a registered letter. But you don't. And then pretty soon you find yourself with a noggin full of interesting information that you couldn't use in any other business. You begin to take a personal pride in your test marks, and the steady rate of advancement. Even your feet become so used to carrying you around all day that you're sure a job at a desk would knock you out.

"It's that way from the top of the service to the bottom. We've all been through the same mill, and officials like Clarke and Grose, in the Chicago office, could step right into this car today and work a case with the best of us. They know our problems and are pulling for us. Sure hope you can write up something that will put the general public in the same frame of mind." END

---

### Lend Lease

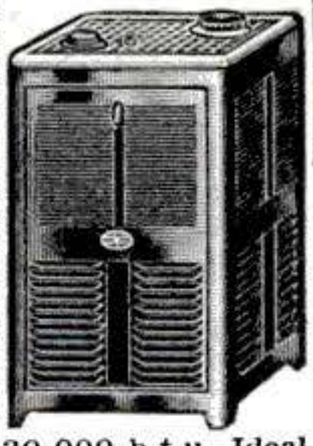
SIGN in warehouse: "Hereafter all strapping tools may be borrowed on LEND-LEASE basis. If we LEND them to you, the LEASE you can do is bring them back."—*Corning Gaffer.*



Copyrighted material

# GET BEDROCK FACTORY PRICES
# SAVE TO 85% ON GIFTS

## CIRCULATING OIL HEATER

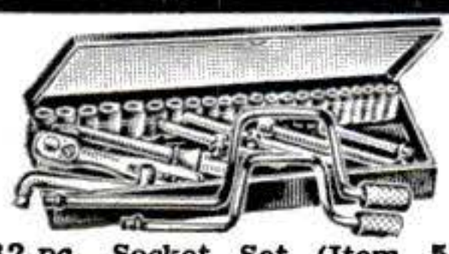


(Item 77) Circulating Heater. Modern, attractive cabinet heater **with built-in powerful, silent fan.** Heats floors and all rooms evenly. Dim. 19 x 17 x 30 in. 7 in. Breeze pot and economizer heat baffle utilizes every bit of heat. 30,000 b.t.u. Ideal for 2-3 rooms, trailers, cottages, etc. Lifetime aluminum cabinet, built-in oil tank. Detroit inlet valve easily connected to outdoor tank if desired. Highest quality. Underwriters Lab. approved. Wt. 60 lbs. Built to sell for $89.00
Sale price..... **$39.50**

## POTTER'S WHEEL

**Power Driven — Foot pedal speed control**
New compact modern design. Precision built to meet exacting requirements of professional artists—the finest wheel ever built. Mechanism fully enclosed for safety and to exclude moisture and clay. Foot-controlled variable speed drive provides instant, smooth speed range of 30 to 150 rpm. Equipped with adjustable arm rests. Easy to operate—even for handicapped persons. Reversible 10" throwing head — back side recessed for casting plaster bats. Larger **18x18"** throwing table; wedging wire attached; removable water cup inside. Heavy bronze bearings pre-lubricated, sturdily built for long, dependable service. Use ¼ hp motor (not incl.). Shipped fully assembled — just mount wheel and motor on table or sheet of ¾" plywood. Self storing—tip up on edge. Wt. 45 lbs. List price $125.00.
Factory special..... **$64.50**
¼ HP 115 V. A.C. Motor for Potter's Wheel, wt. 27 lbs. (Item 258)... **$15.00**

## 32 Pc. SOCKET SET



**32-pc. Socket Set (Item 59)** Highest quality guar. non-breakable sockets made by Husky. Beautiful, matched chrome alloy, absolutely the best. Complete range of 21 sockets from ¼"thru 7/16" in ¼" drive and 7/16" thru 1-1/16" in ½" drive; 2 extensions, reversible ½" ratchet, adaptor bit, slide head, all angle coupling, 2 end wrenches, ¼" speeder handle and sturdy metal tool box. For prof. mechanics who want the best. Wt. 14 lbs. Easily worth $41.50. While they last only..... **$16.95**

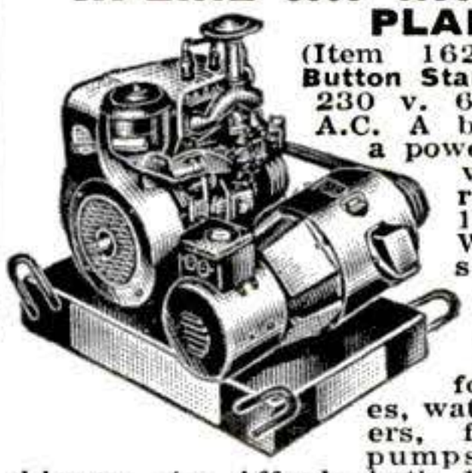
**45 Pc. SOCKET SET**
(Item 205) Contains a complete set of sockets in ½" drive, ⅜" drive and ¼" drive, plus all necessary extensions, handles, speeders, reversible ratchets, etc.; all uncond. guaranteed against breakage. Beautiful matched chromed thin wall alloy sockets in a sturdy handsome steel tool box. Wt. 17 lbs. List price $62.90.
Factory Special..... **$26.95**

## HYDRAULIC JACKS

(Item 208) Heavy duty, precision built, smooth, positive acting with built-in relief valve. Hi-Lift with screw extensions. Govt. surplus at a fraction of orig. cost. (Handle included.)
1½ ton (Item 208) Wt. 11 lbs..... **$6.45**
3 ton (Item 208A) Wt. 15 lbs..... **$9.45**
5 ton (Item 208B) Wt. 17 lbs..... **$11.45**

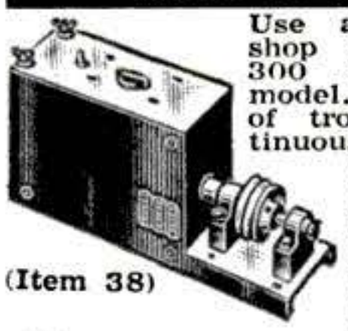
## ELECTRICAL VALUES YOU CAN'T MISS!

### HI-LINE 6000 WATT PLANT



(Item 162) **Push Button Start,** 115-230 v. 60 cycle A.C. A brute of a power plant with a rugged 13 hp. Wisconsin engine. Plenty of electricity for ranges, water heaters, freezers, pumps, machinery, etc. Affords both 110 and 220 volts. Ideal where heavy current is needed. Wt. 590 lbs. Easily worth $995.00. **With self starter.** Factory price... **$645.00**
Generator and control box only, belt driven. Use your own engine or tractor. Wt. 240 lbs.
(Item 163) Factory price. **$345.00**

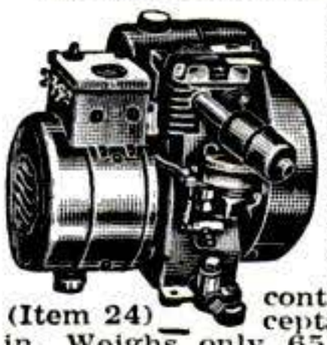
### HEAVY DUTY D-C ARC WELDER



(Item 38)

Use as portable or shop welder. Up to 300 amps. Senior model. Made for years of trouble-free, continuous service. Will handle light or heavy jobs. Easily welds up to ¾" plate using ¼" rods. Built-in air cooling system. Arc is easy to strike and hold, because of specially designed arc stabilizer. Hi-lo switch and dial control gives wide range of welding heats. Run welder at 2600 rpm. with tractor, jeep or 15 hp. gas engine, or 7 hp. elec. motor. Complete with instructions, guar. and double V belt or flat pulley. You can pay more, but you can't buy a better welder. Wt. 110 lbs.
$400 value at..... **$99.75**
**DUAL CONTROL MODEL** same as above but with built-in dual rheostat for low heat soldering, brazing, welding. Spec.. **$119.50**
**WELDING KIT.** Two 10 ft. leads, welding helmet, electrode holder, ground clamp. Sold only with welder at..... **$10.50**
Write for prices and information on A.C. Arc Welders.

### PORTABLE LIGHT PLANTS

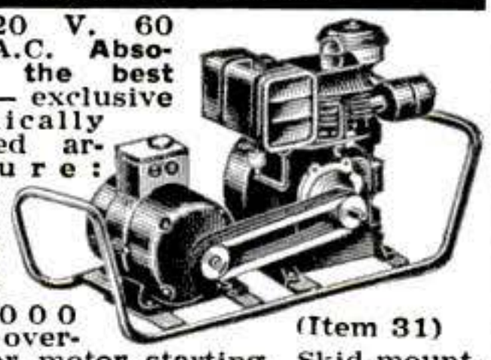


(Item 24)

350 watts—115 v. D.C. powered by a sturdy, easy-starting 1½ hp. Briggs engine, perfect for lights, radios, razors, etc. in cabins or trailers. Use standard light bulbs. Built-in control box with receptacle — just plug in. Weighs only 65 lbs. Item 273. Reg. price $199.50.
A terrific value at..... **$99.75**

**PUSH BUTTON START A.C. PLANT**
500-700 watts—115 v.—60 cyc. A.C. Powered by a rugged 2 hp. easy-starting Briggs gas engine. No wiring necessary, just plug in and operate. Plenty of current for any oil burner, freezer, brooder, emergency lights, etc. which require up to 700 watts. Ideal for Civil Defense, Fire Depts., trailers and camps. Complete with Voltmeter and built-in winding to charge 6 v. auto batteries. Item 24. Wt. 85 lbs. Fully Guaranteed. **Be Prepared if war or storm knocks out power lines.**
Reg. $275 value..... **$143.50**
**700-800 Watt Plant** (Item 44) same as Item 24 but larger engine..... **$169.95**
**1000-1200 Watt Plant** (Item 45) same as Item 24 but larger generator and engine... **$199.50**

### GIANT 2000-2500 WATT PLANT



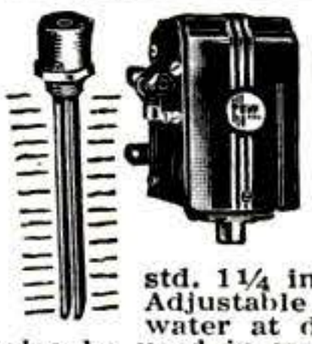
(Item 31)

110-120 V. 60 cyc. A.C. **Absolutely the best made** — exclusive dynamically balanced armature: heavy windings develop up to 5000 watt overload for motor starting. Skid-mounted—portable. Powered by easy starting Briggs or 6 hp. Wisconsin engine—complete with all accessories; engine easily disconnected for other uses. Big outlet box, voltmeter, no wiring necessary. Ample current for all purposes. Factory warranty and complete instructions included. Wt. 220 lbs. Reg. price $585.00. Special at.... **$299.50**

## 79 Pc. CARPENTER'S TOOL SET

Professional quality. A complete set of Master Mechanic tools featuring the famous Stanley brand. All neatly arranged in a beautiful sturdy 32" hvy. steel tool box. Set includes: Powerful ¼" Electric Drill (optional), 3 Stanley Wood Chisels, 29" Spring Steel Saw, Steel Bench Vise, Tin Shears, 9 Drill Bits, Sharpening Stone, 8" Plane, 24" Stanley Level, Hacksaw, Stanley Rule, 5 Double End Wrenches, 13 Asst'd. Hacksaw Blades, Stanley Hand Drill, 10" Vise Wrench, Comb. Square, Stanley Hammer, Stanley Ratchet Brace, Coping Saw, 7 Coping Saw Blades, Steel Wrecking Bar, 4 Screw Drivers, Offset Screw Driver, Nail Set, 4 Asst'd. Files, 8 Pc. Allen Wrench Set, Auger Bit Set and many other tools. Worth at least $150.00 if purchased separately. Save cost of tools on one or two jobs. A terrific value.
Item 242. Wt. 41 lbs. (without Electric Drill).... **$39.50**
Item 242A. Wt. 45 lbs. (incl. Electric Drill)..... **$49.50**
**TOOL BOX ONLY**—Wt. 15 lbs. (Item 243)..... **$8.95**

## Automatic Electric WATER HEATER



(Item 76) Immersion type 115 v. AC — 1250 watts. Convert your present tank to modern automatic hot water heater. Long life Westinghouse or Chromalox element screws into std. 1¼ in. opening in tank. Adjustable thermostat keeps water at desired temp. Can also be used in washing machine or tub. Wt. 8 lbs. Heater element and thermostat regularly $49.50. Special..... **$14.95**
Heater only, for manual temperature control. Wt. 3 lbs..... **$7.95**

## HEATING & VENTILATING FAN

(Item 10) Easily installed in furnace pipes. Forces even heat to all rooms. Over range, removes kitchen smoke and odors. Powerful continuous duty motor, 110-120 v. A.C. Quiet, super efficient fan moves huge volume of air (400 to 600 c.f.m.) 8" Fan, wt. 5 lbs., **$6.85;** 9" Fan, wt. 6 lbs. **$7.85;** 10" Fan, wt. 7 lbs. **$8.85;** 12" Fan, wt. 8 lbs. **$9.85.**
**Heavy-duty** 12" fan, enclosed motor, suitable for spray booths, restaurant exhausts, poultry houses, and other difficult applications. Wt. 12 lbs. Item 10D..... **$12.95**

## MASTER SNOW BLOW

**No Pushing — Self-Propelled**
**It's a lawn mower**
**It's a power sickle**
**It's a cultivator**
**It's a plow**
**It's a bulldozer**
**It's a rotary tiller**

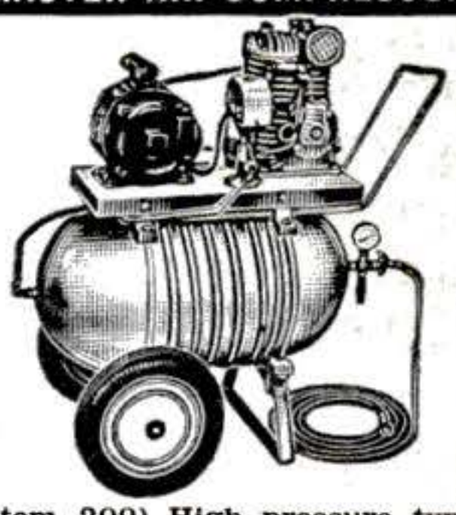
(Item 206)

Here at last is a powerunit that does everything. Works for you year 'round. Does terrific job of clearing snow. Built-in power takeoff to drive pumps, saws, generators, etc. Safety clutch—can't burn out. More versatile and efficient than tractors costing twice as much. Basic self propelled 2 hp. tractor—Briggs or Clinton engine. Only **$119.50**
Tractor shown with snow blow attachment.

| | |
|---|---|
| **Snow Blow** | **$29.50** |
| **Lawn Mower Hitch** | **$4.50** |
| **Cultivator** | **$8.75** |
| **Rotary Tiller** | **$42.50** |
| **Sickle Bar-Mower** | **$42.50** |
| **Bulldozer** | **$11.25** |

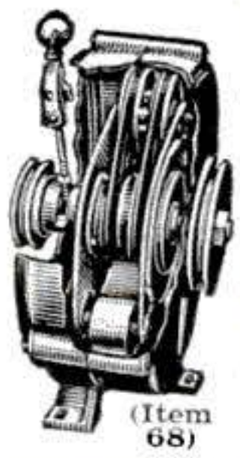
Freight prepaid to most areas. Easy payment plan available.

## MASTER AIR COMPRESSOR



(Item 209) High pressure type for large volume of air for heavy duty service. For paint spraying, inflating truck and auto tires, greasing, and the hundreds of other jobs done by compressed air. Piston type. 2" bore compressor with built-in air filter. Master built with hi-strength alloys and precision bearings. Stainless steel tank, 12"x24", 2100 cu. in. cap. Safe up to 500 lbs. Equipped with automatic switch that starts and stops motor to maintain desired pressure (up to 150 lbs.) and check valve, safety valve, gauge, shut-off valve, 20 ft. air hose and tire chuck. Beautifully balanced on ball bearing wheels and rubber tires. Low factory prices.
With ⅓ hp. 110 v. A.C. motor (Reg. $175.00) (Item 209)..... **$98.50**
With ½ hp. motor (Reg. $199.50) (Item 209A)..... **$119.50**
With 2 hp. Briggs Gas Engine (Reg. $199.50) (Item 209B)..... **$109.50**
Write for price of compressor only. A complete line of spray guns and air tanks available.

## Variable Speed Selector



(Item 68)

Heavy duty, made by **B. F. GOODRICH** for industrial use. Provides instant speed changes for any drive. For machine tools, dryers, printing, conveyors, production lines, hoists — any operation requiring variable speed. Ideal for midget autos. Employs reliable "trouble free" planetary system. No hydraulic power losses or creeping. Infinite range, smooth operation, easy installation (data included). 3 sizes: ½-1 hp. wt. 36 lbs.; 1-2 hp. wt. 55 lbs.; 2-3 hp. wt. 105 lbs. Reg. list $228, $252 and $352. Our prices . . . **$79.50, $89.50** and **$114.50.**

## Factory Prices on Catalog Items

Send 10¢ for **BIG 1953** catalog. **Hundreds of bargains**

**Prices f.o.b. Factory. 10 day Money back guarantee. Send check or Money Order**

**MASTER MECHANIC MFG. CO., DEPT. 58-B Burlington, Wis.**

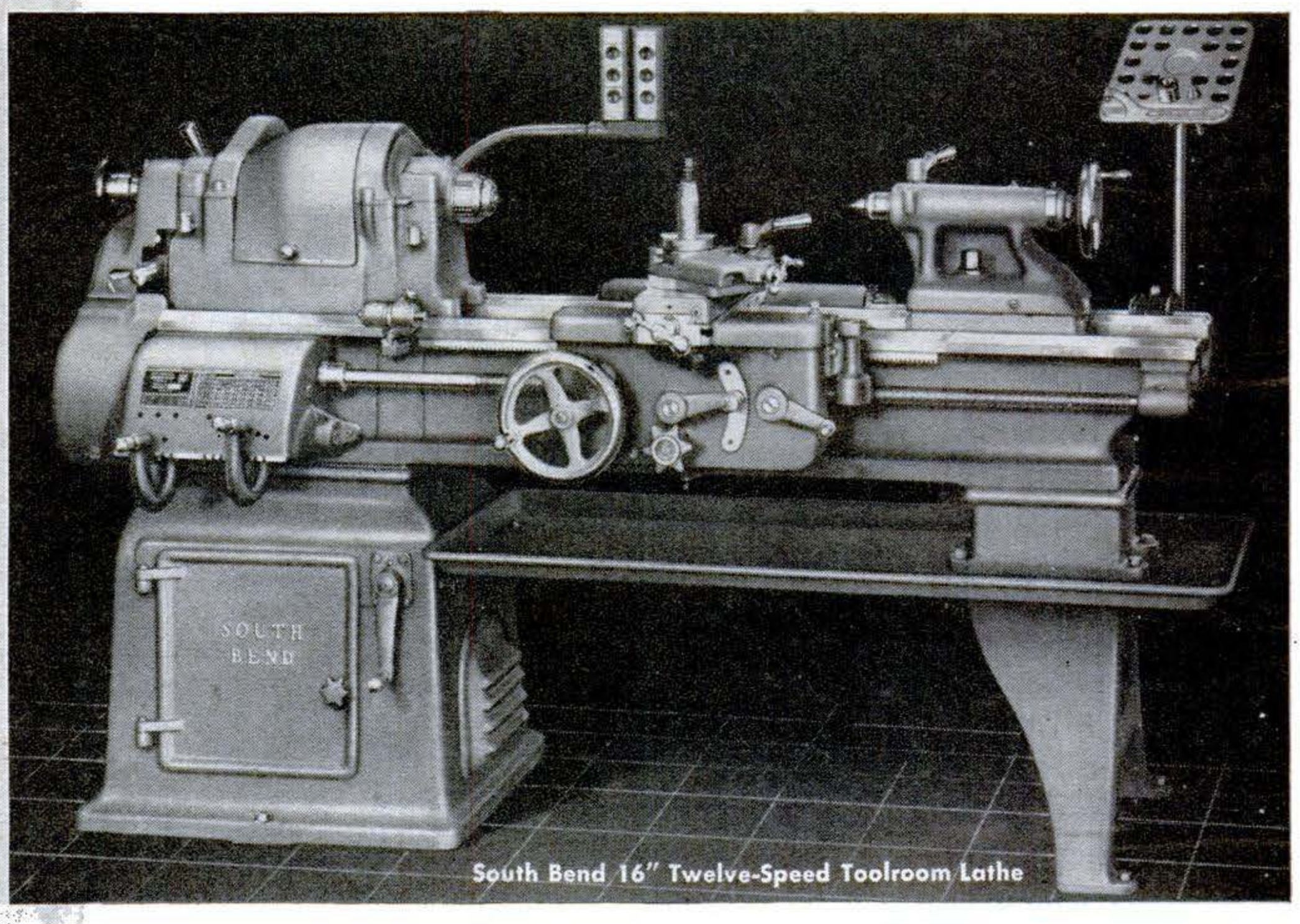


Copyrighted material

# Cuts Machining Time

# SOUTH BEND 12 SPEED LATHE

The wide range of spindle speeds on this new lathe cuts machining time because the operator quickly selects the right speed for each operation. Push-button control provides a fast change from any high speed to the corresponding low speed. This versatility is further increased by 48 choices of longitudinal and cross feeds which insure maximum efficiency on every job. Also, you will find that its accuracy and ease of operation make your tough jobs easy. Send the coupon for complete information about this new lathe.



South Bend 16" Twelve-Speed Toolroom Lathe

**SPECIFICATIONS**

**Spindle Speeds** (approx.) Direct: high range 300, 550, 945; low range 150, 278, 475. Back gear drive: High range 32, 70, 118; low range 20, 33, 60.

**Spindle Bore** — 1⅜".

**Swing** over bed and saddle wings — 16¼".

**Swing** over saddle cross slide — 9⅝".

**Distance between centers** — 33¼", 45¼", 57¼", 81¼", 105¼".

**Collet Capacity** — 1" maximum.

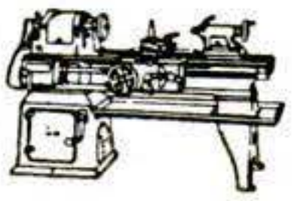
**Longitudinal Feeds** — 48 R.H. or L.H., .0015" to .0841".

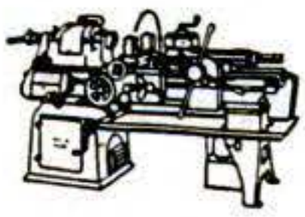
**Cross Feeds** — 48, .0006" to .0315".

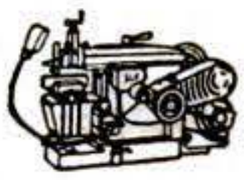
**Thread Pitches** — 48, 4 to 224 per inch.

**SEND INFORMATION CHECKED:**

☐ _____







☐ TOOLS & ATTACHMENTS ☐ 9" and 10" BENCH LATHES ☐ 10" to 16-24" FLOOR LATHES ☐ ½" and 1" Collet TURRET LATHES ☐ 14" DRILL PRESSES ☐ 7" BENCH SHAPERS

Name _____ Company _____

Street _____ City & State _____

*Building Better Tools Since 1906* • **SOUTH BEND LATHE** • South Bend 22, Indiana



Copyrighted material

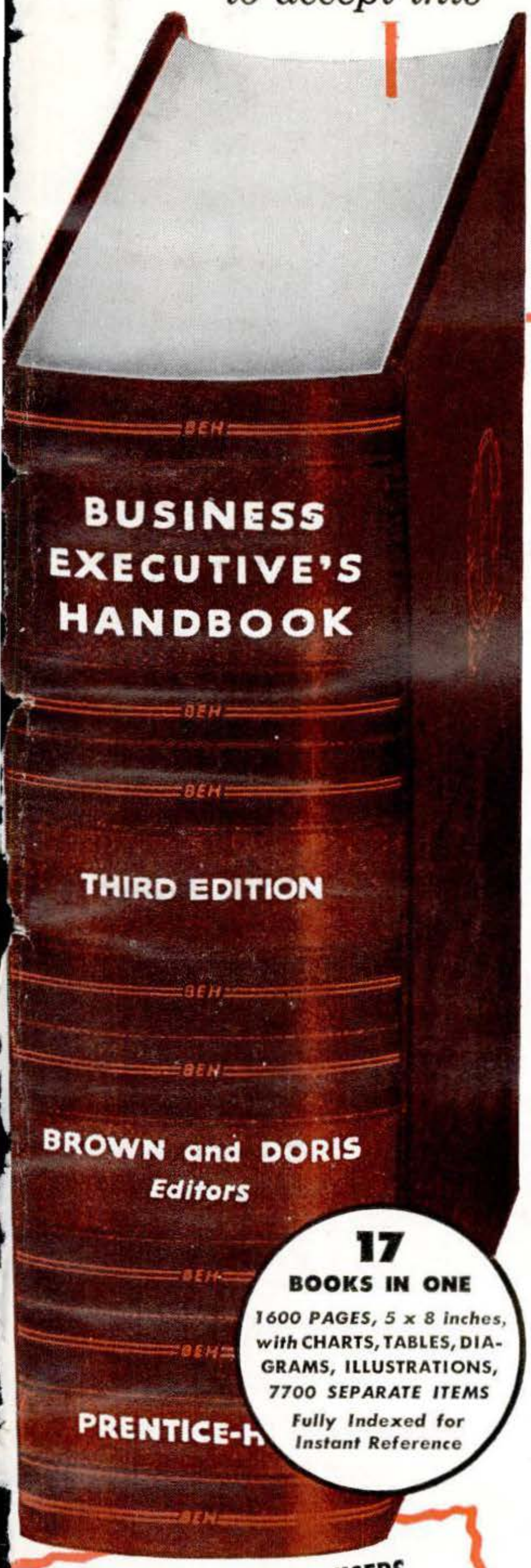
*You are invited to accept this*

# FREE TRIAL AND

Simply mail coupon below to receive, *as a gift*, a copy c

## "BUSINESS LETTERS AND HOW T

You can use this handy manual almost every day, to help you writ —how to reply to inquiries—grant or refuse requests—reply to com ments—solicit business, etc. Explains technique of successful letter w letters. Now in its 21st Printing—has been bought by thousands of when you return coupon below for FREE-trial copy of "Business E




THE PRENT

# BUSINESS EXECUT

Here in one great practical handbook is brought together thousands of useful facts and proven methods by which you can advance yourself in business, step up profits, reduce operating expenses, make the most of your business future. Puts at your fingertips the

**See below—just a small fraction of the thousands of items on which the BUSINESS EXECUTIVE'S HANDBOOK gives you practical money-making guidance:**

**THE DOLLARS AND CENTS OF BUSINESS:** A real executive knows how to "figure"—knows short-cuts in business mathematics that make him a quick thinker in a business deal. This section of the Handbook shows you: how to calculate simple and compound interest; bank discount; savings through cash discount; trade discounts; averages; markup and selling price; annuities; sinking funds and amortization; depreciation; freight rates; verifying by check numbers; tables of weights, measures and values; miscellaneous tables.

**WRITE BETTER LETTERS:** Can you put your ideas across "on paper"? This section of the Handbook covers: a plan to improve letters; compiling a correspondence manual; letter-appraisal chart; tone and spirit of the letter; how to answer an inquiry; letters refusing requests; letters to revive inactive accounts; letters that build goodwill; how to answer complaints; legal aspects of business letters; mechanics of the letter; special forms of address; dictionary of correct usage.

**HOW TO SELL BY DIRECT MAIL:** What products can be sold? What are the steps in planning direct-mail selling? Here is expert guidance on: selecting lists; types of direct mail; self-question chart of direct advertising; testing direct mail; how to record results; how to get and build mailing lists; how to write sales letters.

**HELPFUL FACTS ABOUT ADVERTISING:** Facts for small advertisers; developing demand; how to work with an advertising agency; fixing the advertising appropriation; selecting the right media; testing your advertising; how to design and register a trade-mark; copyright procedure; printing and typography.

**MANAGING SALESMEN:** If you are ever required to build and manage a sales force, turn to the Handbook for useful facts on: determining sales territories; sales quotas; recruiting and selecting salesmen; equipping, training and compensating salesmen.

**SALES CONTRACTS AND FORMS:** Essentials of a contract; when a sales contract must be in writing; forms of contracts for sale of merchandise; conditional sales contracts; lease agreement; miscellaneous clauses in sales contracts; contracts appointing agents for sale of merchandise; miscellaneous clauses in agency agreements; contracts employing salesmen; special provisions in salesmen's contracts; foreign trade definitions.

**HINTS ON BUYING MERCHANDISE:** Buying the right thing; how to standardize specifications; buying the right amount at the right place, at the right time, at the right price; procedure for handling and analyzing bids; requisitions and purchase orders; receiving and inspecting incoming goods; checking invoices; stores and inventory control.

**HOW TO MANAGE AN OFFICE:** Do the little details of office routine "throw" you? Here is a commonsense road-map to follow when you need help on: planning and maintaining the offices for efficiency; equipment, files and appliances; making office procedure function smoothly; economies in the use and printing of forms; hiring and training new employees.

**HOW TO CHECK CREDITS AND INCREASE COLLECTIONS:** Sources of credit information; Dun & Bradstreet reports; special agency reports; credit interchange; salesmen, attorneys and banks as credit references; law relating to checks, notes, drafts or bills of exchange; how to write letters granting or refusing credit; how to write collection letters and reminders; form collection letters.

**HOW TO DEAL WITH THOSE WHO OWE YOU MONEY:** Collection of a claim by suit on the unpaid obligation; out-of-court agreements; assignment for benefit of creditors; equity receiverships; voluntary or involuntary petition in bankruptcy; corporate reorganizations; wage earners' plans.

**FINANCIAL STATEMENTS:** Do you know how to read a balance sheet? The Handbook tells you the meaning of: current assets; fixed assets or fixed capital; tangible fixed assets; investments; deferred charges; current liabilities; fixed liabilities; deferred credits; contingent liabilities; reserves; capital stock; surplus.

**BUSINESS INSURANCE:** How to reduce the cost of ample insurance protection; law governing insurance policies; types of policies; fire, burglary, theft, robbery insurance; fidelity and surety bonds; credit insurance; miscellaneous coverages; business insurance; group insurance.

**DIRECTORS, OFFICERS, STOCKHOLDERS:** Law relating to directors; removal of director with or without cause; liability of director for acts beyond corporate powers; law relating to officers; liability of an officer for mismanagement; rights, liabilities of stockholders.

**CORPORATE MEETINGS, MINUTES AND RESOLUTIONS:** Preparations for meetings; stockholders' meetings; directors' meetings and committee meetings; how to keep minutes of meetings; parliamentary procedure.

**PARTNERSHIPS:** What a partnership agreement should contain; division of profits and losses among partners; liability of a secret partner; power of a partner to borrow money, collect debts, employ assistants, purchase and sell property; liability of an incoming partner; changing to a corporation.

**TYPES OF BUSINESS ORGANIZATIONS:** Choosing a form of organization for a business; raising of additional capital; power to do business in any state; choosing a name under which to do business.

**OVER 180,000 SATISFIED USERS**

old mine of information."—*C. W. Wall (Kansas)*
st book on business I've ever seen. Wouldn't take
00 for my copy." —*Stuart Randolph (Georgia)*
reatly exceeds what I expected. I wish I had
wn of your offer sooner."—*V. C. Glass (Texas)*
ne of the finest aids available to an enterprising
siness man today."—*J. H. Bailey (Minnesota)*

**SEND NO MONEY — USE 10 DAYS FREE**

on't send a penny now. Just mail coupon to get this
emarkable Handbook for 10 DAYS FREE TRIAL.
See for yourself how YOU can step up your income
with this Handbook packed with practical business
facts you can use to cut costs—save time—build
profits—MAKE YOURSELF WORTH MORE MONEY.

**MAIL THIS CARD NOW**

# No other anti-freeze gives your car the same complete protection!

## WITH PRESTONE BRAND ANTI-FREEZE

### You're SET

Just put "Prestone" anti-freeze in and forget it till spring! No "boil-away" worries . . . no repair bills — its special inhibitors give the world's best protection against rust, clogging and foaming.

### You're SAFE

High compression engines and car-heaters make non-evaporating anti-freeze more important now than ever. There's not one drop of boil-away alcohol or methanol in "Prestone" anti-freeze.

### You're SURE

With "Prestone" brand anti-freeze in your car, you're sure you've bought the best. It's America's No. 1 brand. No other anti-freeze gives your car the same complete protection. It's guaranteed!

**NATIONAL CARBON COMPANY**
**A Division of Union Carbide and Carbon Corporation**
***30 East 42nd Street, New York 17, N. Y.***

The terms "Prestone" and "Eveready" are registered trade-marks of Union Carbide and Carbon Corporation

| | |
|---|---|
| $3.75 PER GAL. | $1.00 PER QT. IN QUART CANS |

Copyrighted material